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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Major Lefebure's Book

"THE RIDDLE OF THE RHINE," by Major Victor Lefebure (W. Collins, Sons & Co., 10s. 6d.), is a work which no serious student of chemical warfare—considered either in its purely scientific and technical aspects or in its bearing on the larger problem of disarmament—can afford to ignore. It is at once a history, an argument, and a conclusion. The history of the organised employment of chemical agents for military purposes begins with the first German gas attack at Ypres in April of 1915. Step by step, with unwearying patience and a scientific detachment of mind, the author traces its development up to the end of the war. It is a critical, dispassionate story, in which the facts are largely left to produce their own effect. Side by side are seen the ever growing military importance of the chemical weapon and the progressive research and understanding which gradually brought under scientific control these new and fearful forces. Outside the domain of strict history the author indicates the developments in any future war which may follow on our experiences in the last. It is a piece of convincing, workmanlike, and unemotional history.

When we come to the argument erected on the facts, the effect is equally convincing. The introduction of the first gas attack by the Germans was intended to be, and was, a military surprise. They had agreed in an Article in The Hague Convention "to abstain from the use of projectiles the object of which is the diffusion of asphyxiating or deleterious gases." They broke the covenant in the hope of securing victory by surprise, and the array of cold facts marshalled by Major Lefebure shows that their scientific preparations long preceded the actual outbreak of war. To meet and defeat them at their own game, we had to organise enormous national enterprises to fulfil our explosives programme. Germany required no such improvisation. Already in the works of the Interessen Gemeinschaft, "the world power in organic chemical enterprise," it had its sources of chemical supply. "This organisation," the author warns us, "emerges from the war with renewed and greater strength. Our splendid but improvised factories drained the vital forces of the nation, and now lie idle, while German war chemical production fed new life-blood and grafted new tissue to the great pre-war factories of the I.G., which, if she will, she can use against us in the future."

The conclusion of all this is not a glorification of chemical warfare as the great military weapon of the future, nor any apology for it as more humane than other weapons. We are merely invited to recognise the plain fact that disarmament, which does not involve chemical disarmament, is a myth. The conditions and implements of warfare have been fundamentally changed by the chemists of Germany. "By the concentrated application of electricity, chemistry, and other sciences to war, two dominating factors have emerged, whose importance to war, and danger for world peace, can only gain momentum with time. The scientific or technical initiative, the invention of a deadly new chemical, wireless-directed aeroplane, or other war appliance and their incidence on war through large-scale production in the convertible industries of peace constitute a challenge, which, if unanswered by practical schemes for world disarmament, will render the latter worse than useless." The guarantee against the new menace, it is argued, lies in a world redistribution of organic chemical production. Major Lefebure states the conclusion with admirable conciseness. "Safety demands strong organic chemical industries or cumbersome and burdensome chemical warfare establishments. The stability of future peace depends upon the former, and the extent to which we must establish, or can

abandon, the latter depends entirely on the activity and success of those whose special duty it is to organise against war."

In the end, then, Major Lefebure emerges, not as an enthusiastic advocate of chemical warfare, but as an exceptionally informed student who wishes to safeguard the world against it. His aim is to promote, not to obstruct, disarmament. But he desires an effectual instead of an illusory disarmament—disarmament, in a word, in the terms of our present knowledge and experience of chemical possibilities, and not in the obsolete terms of military science as understood in 1914. In practice this means the distribution of organic chemical industries throughout the world so as to secure a new balance of power.

Liability for Crown Contracts

MR. JUSTICE DARLING'S judgment, in the action British Cyanides Co., Ltd., *v.* The King, tried in the King's Bench Division last week, definitely establishes the liability of the Crown for a contract rather loosely entered into by its agents or officials, as many were during the war, to provide urgent national necessaries. In this case the plaintiff or suppliant company undertook to provide permanganate of potash, which was urgently needed by the Government. The call for it was greatly increased when an acute shortage of sugar arose, and permanganate of potash was required in abnormal quantities for the manufacture of saccharine as a substitute. By the use of the chlorine process, the discovery of Mr. Kenneth Chance, it was found possible to meet the country's requirements, but admittedly it was understood that the chlorine process was too costly to produce the article on the ordinary commercial basis. At that time cost mattered very little, but production was vital, and in these circumstances one can easily understand any official anxious to obtain the necessary supplies telling the manufacturers to go ahead, and not troubling about expense. When, however, the Armistice came and special supplies were no longer required the question arose as to the position of the manufacturers who had responded to the nation's call by putting down additional plant and incurring other liabilities virtually at the invitation of the Government. The British Cyanides Co. were in this position. The Crown apparently recognised no liability, but forced the company at the heavy cost of an action in the High Court to prove the Crown liable. The company succeeded, in part at least, and the judgment in their favour will be generally received with sympathy and approval.

It by no means follows, however, that this judgment, with costs, will completely compensate the company for all the extra expenditure incurred. The company sought, in the first place, to be reimbursed and compensated for the damage suffered by them through the failure of various Government Departments to continue to provide that permanganate of potash should be bought from them in accordance with an implied agreement In so far as this meant the continuance of the implied contract until the company had been completely recouped for all their expenditure, the judge was unable to accept the claim. He found, however, as a fact, that there was an agreement that reasonable notice should be given to terminate the contract, so that the company should not be left with large stocks on hand or with contracts which would hamper them in the ordinary working of their business. The result of this finding was a declaration that the company were entitled to damages for the breach by the Crown of the implied promise to give reasonable notice before terminating orders for the supply of permanganate of potash in the quantities and at the prices agreed on. The length of notice and the figures are to be referred to an official referee, by whom the amount of damages will presumably be fixed.

One must not apply too strictly the calm and considered business methods of normal times to contracts entered into in circumstances of great urgency and anxiety, but where the Government appealed to contractors to meet them virtually at all costs in matters vital to the national interest, they might reasonably be expected to interpret their liabilities in a generous spirit. Here, however, they appear to have rested solely on the legal position and to be prepared to recognise only the liabilities which the courts chose to enforce. They have done, therefore, as little rather than as much as they could to meet the company's case, and very little sympathy, we think, will be felt with them in having judgment given against them. The company may derive some satisfaction from another point. The contract was not reduced to terms with the precision that would be observed in normal times; it seems to have been arranged in personal conversations and even over the telephone. In such circumstances the judge has to be guided by the evidence on either side, and here he seems to have been impressed by the business-like account of the transactions given in the box by Mr. Kenneth Chance and substantially to have accepted his version. It is a compliment worth having. Mr. Chance may be congratulated on the Court's testimony to his conduct in the matter and the company on having secured at least part of their claim for loss.

Smokeless-fuel Developments

DURING the present week considerable attention has been given in the daily Press to what is described as a "revolutionary fuel invention." As a matter of fact, the discovery merely relates to the well-known principle of low-temperature carbonisation, whereby a smokeless fuel containing about 12 per cent. of volatile matter is produced. During the last few days the plant at the Barnsley works has been thrown open to inspection in order that both technical and lay observers might have an opportunity of criticising the latest modifications which have been applied in connexion with the old "Coalite" process. There is no question that the original defective process has been vastly improved, and that a very successful retorting plant has now been evolved; but even if, mechanically, the *ne plus ultra* has been attained it must still be borne in mind that economically and commercially the problem of smokeless fuel is by no means solved. In this connexion one cannot do more than refer to the unprejudiced view of Sir George Beilby who, as Govern-

ment Director of Fuel Research, has called attention to the fact that the attractive prospect of a smoke-free atmosphere has been spread before our eyes for many years by enthusiastic inventors and company promoters, yet its realisation always seems to move a little farther into the future. As Sir George says, the problem has two distinct sides—the technical and the economic—and until a fair-sized industrial plant has been carried on continuously over a long period, making and disposing of all the products of carbonisation under steady market conditions, no one can predict whether or not the process will be a profitable one.

Unfortunately the commercial solvency of the process must necessarily be at the mercy of the prevailing markets for primary and secondary products. Again, the inherent defect of semi-coke is invariably its extremely friable nature and its exceptional tendency to disintegrate during transportation. In spite of the advances made at Barnsley, this problem would still seem to arise, and one is prompted to contrast the retorting method adopted with the admirably simple self-briquetting arrangement which is in use at the Fuel Research Station. Those, however, who have been behind the Barnsley developments are entitled to a generous share of credit for their enterprise in conducting research which is all helping to bring us nearer to the technical ideal. It is from the economic standpoint that the main difficulties must be expected, but there is no need to abandon hope of eventually abolishing the smoke evil. Smokeless fuel is not the only antidote; as an alternative one can always turn to the much wider utilisation of gaseous fuel, and the adoption on much broader lines of electricity. The main difficulty which faces the extension of gas and electricity as domestic fuels is the obstinacy with which the Englishman clings to the open grate. With smokeless fuel he can still retain his homely looking fire; but for semi-coke to succeed it is essential that it should be sold at a price which does not exceed that of raw coal.

Chemists' Unemployment Fund

THE scheme for providing chemists with unemployment benefit, drawn up by the British Association of Chemists, was exhaustively discussed at a meeting of the Manchester Section last week. Subject to fuller consideration of details, the principle of the scheme was warmly approved, and the matter will come up for further discussion at the annual meeting on October 29. The authors of the scheme have adopted what is called the "unit" system—that is, each member will be obliged to pay one "unit," say £1 a year, to secure a certain amount of benefit, but it will be open to members voluntarily to contribute more than one "unit" with the object of securing additional benefits. The compulsory principle is the only one on which such a Fund can be organised. As to the actuarial basis the members must be largely guided by expert advice, which usually inclines to conservatism, and in the absence of actual experience there must be risks, though these are not larger than is usual. The authors are wise in treating the scheme in the strictest business sense, and making it clear that members contribute subscriptions simply to secure benefits. Where the habit arises, in the case of well-to-do members, of refraining from claiming benefits to which they are entitled, a false dignity is sometimes created which places the member who cannot afford to surrender his benefit in a delicate position. It is desirable from the outset that the danger of splitting the members virtually into two classes should be avoided by administering the scheme on strictly economic and equal lines.

A Naive Admission

ONE of the naïvest admissions yet made in connexion with the policy of licensing imports is contained in some correspondence which has just passed between the Board of Trade and the Chemical and Dyestuff Traders' Association. Complaint was made that reparation dyestuffs imported by the Board of Trade were being offered in the trade through a particular firm at prices with which British manufacturers and merchants could not compete. The Board's reply is that they have given consideration to the question of the distribution of reparation dyestuffs in consultation with dye users and dye manufacturers, and as a result have decided that in the interests of the trade generally steps should be taken to dispose of these supplies as rapidly as possible "even though in some cases they may involve direct competition with British products of a similar nature." This memorable passage, coming from a Department whose one concern of late has been the safeguarding from foreign competition of native British industries, is too precious to be left in obscurity.

The Calendar

Oct. 24	Sheffield Association of Metallurgists and Metallurgical Chemists. Address by Sir Robert A. Hadfield. 7.30 p.m.	Mappin Hall, Dept. of Applied Science, Sheffield.
26	The Industrial League and Council: "Profit Sharing and the Coal Settlement." Mr. E. W. Mundy.	Caxton Hall, Caxton Street, Westminster, London.
28	University of London: "Nutrition." Dr. J. C. Drummond. 4.30 p.m.	South Kensington
28	Manchester Literary and Philosophical Society: Chemical Section. 7 p.m.	Manchester.
29	British Association of Chemists: Annual General Meeting. 3 p.m.	Midland Hotel, Manchester.
Nov. 1	Hull Chemical and Engineering Society: "Some Applications of Physical Chemistry to Industry." J. Price Jones. 7. 30 p.m.	Wilberforce Café, Waterworks Street, Hull.
2	Society of Public Analysts: Papers by C. Butler Savory, J. C. Drummond, A. F. Watson, and A. Lucas. 8 p.m.	Burlington House, Piccadilly, London.
3	Chemical Society: Informal Meeting. 8 p.m.	Burlington House, Piccadilly, London.

Books Received

THE RIDDLE OF THE RHINE. By Major V. Lefebure. London: Collins, Sons & Co., Ltd. Pp. 279. 10s. 6d. net.

THE POPULAR CHEMICAL DICTIONARY. By C. T. Kingzett. London: Baillière, Tindall & Cox. Pp. 539. 21s. net.

ATOMIC THEORIES. By F. H. Loring. London: Methuen & Co., Ltd. Pp. 218. 12s. 6d. net.

British Cyanides Co. v. The King

Successful Action in Support of War-time Contract

Mr. Justice Darling, in the King's Bench Division of the High Court, on Saturday, gave judgment for the suppliants in a petition of right in which the British Cyanides Co., Ltd., claimed compensation for damage suffered owing to the failure of various Government Departments to continue to buy permanganate of potash under an implied agreement.

THE hearing of the petition was begun in the King's Bench Division on Thursday, October 13. In addition to the claim to be reimbursed and compensated for damages for alleged breach of contract the suppliants alleged that certain special plant which they had erected at great expense, on the directions of the Departments referred to, so that the output of permanganate of potash might be increased, was now of no use to them and involved them in great loss.

The Plaintiffs' Case

Sir John Simon, K.C., in stating the plaintiffs' case, said that the plaintiffs were manufacturers of chemicals, and the managing director of the company, Mr. Kenneth Chance, was a distinguished chemist. The company alleged that during the war the Crown called upon them to make a certain product in such circumstances that it was reasonable to infer that a contract was concluded. But the company, after incurring great expense to produce the compound, subsequently found that they had it left on their hands, as the Government refused to purchased it. During the war there was a great scarcity of permanganate of potash, but Mr. Chance discovered a valuable process by which it could be obtained from the powder passing over blast furnaces. Our supply had hitherto come from abroad, but as a result of Mr. Chance's discovery the company found that they could produce about two tons a week, which was of the utmost importance to the country. Mr. Chance went immediately to the Board of Trade, so that the Government should have an opportunity of acquiring their product direct from the manufacturer. He was referred to a Mr. Woolcock and he made a verbal agreement whereby the Government agreed to pay the company 3s. 6d. a pound for their potash. This was in September, 1916. By October, 1917, it became clear to the authorities that they would require a much larger output.

The Chlorine Process

During this time Mr. Chance had discovered a new method, the chlorine process, which increased the output by 50 per cent., but also increased the cost of production. About this time a new sort of demand for potash arose. Messrs. Boots, the chemists, required large quantities of it, because the Government were calling for enormous quantities of saccharine, and it needed 10 tons of permanganate of potash to make 4 tons of saccharine. He was instructed that in consequence of the general use of saccharine in place of sugar at that time, every ton of permanganate produced meant a saving of 225 tons of shipping space.

The Government formed a scheme to get the manufacturing chemists of the country to make saccharine, and for this purpose they had to be supplied by the Government with the necessary permanganate. This was explained to Mr. Chance, who entered into the scheme in the autumn of 1917. The Crown, however, were not buying the potash. They were providing people who would buy, and the Crown undertook that these people would pay 5s. a pound. On May 2, 1918, there was an interview between Mr. Chance, Mr. Woolcock, and Colonel Harrison, who was interested at the time in anti-gas devices. At the interview arrangements were made for a greatly increased supply of saccharine, and therefore a demand was made on the Cyanides Company for a greatly increased output of permanganate. Mr. Woolcock, on behalf of the Government, demanded that they should increase their output to 15 tons a week, which was considerably more than they had ever done. It was pointed out by Mr. Chance that this would necessitate considerable extra expenditure in the way of additional plant, and he asked that there should be some clear direction from the Government on the matter. From May, 1918, Mr. Woolcock and Dr. Shaw were constantly keeping their eyes on what was being done, and paid numerous visits to the works and made suggestions. By December, 1918, the company had increased their plant to such an extent that they were producing 10 tons a week. Then the Armistice came. But it was the intention of the Government to retain control for 12 months after the Armistice. Dr. Shaw, of the Army Medical Department, informed Mr. Chance that the Government demand for the permanganate would continue for a year after the Armistice. In the month of December the Government put an end to their purchases of saccharine from the chemists and bought large quantities cheaply from America. It was only through Messrs. Boots that the British Cyanides Company discovered that the Government had absolutely abandoned the scheme under which they had been invited to spend large sums of money on new plant.

The position in law was that the request by the Government to the British Cyanides Company to produce potash, involving a large expenditure, implied an agreement to compensate them reasonably for what was produced, and it did not matter that there was nothing in writing. The Government, however, took up the attitude that there was no contract, and now placed on the company the burden of proving that there was a contract.

Mr. Kenneth Chance's Evidence

Mr. Kenneth Chance said that he discovered the process by which permanganate of potash could be made from the dust passing through blast furnaces. Before the war permanganate of potash was not made commercially in Great Britain, and in consequence, at the outbreak of war, the price rose enormously. As soon as he discovered that his firm could manufacture permanganate he made inquiries at the Board of Trade, and was referred to Mr. Woolcock at the Army Contracts Department. That was in September, 1916. At that time the market price was 7s. 6d. to 8s. a pound. He offered to supply the Army Contracts Department at 3s. 6d. a pound. The process he was using then was known as the CO_2 process. The Army Contracts Department took the bulk of his output, but there was a small surplus which he sold on the market at 10s. a pound. Later, he adopted the chlorine process. This was much more expensive, but it was also more productive. The chlorine process took altogether four weeks from start to finish. From 1916 he knew that permanganate of potash was required for the manufacture of saccharine. Messrs. Boots were then the largest manufacturers of saccharine. He knew in August, 1917, that the supply of permangate for saccharine was in connexion with a Government scheme. In January, 1918, he knew that the Government were controlling the saccharine manufacturing firms. In the meantime he had introduced the chlorine process, and the price had gone up to 5s. a pound. His firm supplied permangate to the saccharine manufacturers in consequence of the directions of the Government.

He had an interview with Mr. Woolcock and Colonel Harrison at which Mr. Woolcock told him that arrangements were being made with the Ministry of Food for a largely increased supply of saccharine, and he was asked to increase his output of potash to 15 tons a week. He said that he was doubtful whether they could do it, but he would go into the whole matter. Later he wrote saying that to turn out the quantity required would mean laying out their whole plant afresh. He received a reply from the Contracts Department of the War Office, stating that the requirements of permanganate for saccharine alone would be 9 tons, while the needs of the Army Medical Department and of the community had also to be considered, and they would therefore require an output from them of about 15 tons a week. Late in 1918 he heard that the Government had bought large quantities of saccharine from America and were cancelling their orders to the saccharine makers in this country. He therefore wrote to the War Office protesting that no notice had been given to him of this move and pointing out the seriousness to themselves after all the expense they had incurred on the instructions of the Government.

Cross-examined, the witness said that his company made a

good many other chemicals besides permanganate of potash, and at the outbreak of the war they were receiving large quantities of orders which involved increases of their plant. Up to May, 1918, there were often tenders and written contracts for the supply of permanganate to the Army Contracts Department, but they also frequently supplied without making written contracts. They were always urged by Government Departments to push forward the production of permanganate of potash on commercial lines, so that, after the war, this country might be independent of German supplies. His board considered the matter of laying down additional plant, and came to the conclusion that they could do so. He did not write any letter after the plant was laid down making any claim.

The Crown's Defence

The principal witnesses for the Crown were Mr. W. J. U. Woolcock, M.P., and Dr. W. Vernon Shaw.

Mr. Woolcock

Mr. Woolcock, M.P. for Central Hackney, said that he was a pharmaceutical chemist, and was in the Army Contracts Department during the war. In 1916 he first became aware of the scarcity of permanganate of potash, and in May, 1918, he had interviews with the suppliants. He could not decide whether the chlorine process was an economic process.

In cross-examination by Sir John Simon, the witness agreed that in April, 1918, Mr. Chance told him of a new process. He could not, however, remember whether Mr. Chance explained that the new process was more productive, but also more costly.

Sir John Simon: Acting in the public interest, would you have cared—if the new process was more productive—whether it was more costly?—At that time, when things were so serious, I should not have cared if it had been more costly.

Did you say that it didn't matter how expensive the process was, but that it was output you were after?—I do not remember saying so, but it is possible that I may have done so.

The witness agreed that Mr. Chance told him that increased output meant new plant.

Dr. Shaw

Dr. William Vernon Shaw, medical officer at the Ministry of Health, said that he was "lent" to the Ministry of Food while that Ministry was organising the supply of saccharine. It was not until December, 1918, that the production of permanganate was sufficient to meet requirements. Then the saccharine makers found that they had lost their market.

Mr. Justice Darling: Was that because saccharine was being obtained from another source?—Yes, early in the year the Ministry of Food had placed an order for saccharine in America, but it was not delivered in this country until after the Armistice.

Cross-examined by Sir John Simon, the witness agreed that the manufacturers did not fail the Government, but that the Government gave them notice of termination. He spoke over the telephone to Mr. Chance, and told him that the saccharine manufacturers were coming to an end of their contracts and Mr. Chance's permanganate would, therefore, not be required.

Sir John Simon: I suggest that you never made any communication to Mr. Chance, but that he learned it later from Messrs. Boots?—I must still hold my opinion.

Later, the witness said that when he agreed with Mr. Chance to pay him 5s. a pound for the permanganate up to January, 1919, he was speaking privately rather than officially. Further cross-examined on the point, he said that he was speaking in an official capacity.

At the conclusion of the evidence for the Crown Mr. Kenneth Chance was recalled and stated that no general cancellation of orders was received from the Government either through the telephone, by word of mouth, or by letter. He first heard of cancellation in conversation with Sir Jesse Boot in January, 1919. To this day he had never heard from the Ministry of Food that they had decided to cancel their contracts. The chlorine process was not commercially possible owing to its expense.

It was mentioned that the total of the suppliants' claim was for more than £46,000.

Judgment against the Crown

In giving judgment, Mr. Justice Darling said that undoubtedly the suppliants had been asked by officers of the Crown to increase their production of permanganate of potash, and undoubtedly they had explained that to do so they would have to make use of the chlorine process, which, in ordinary times, would be useless to the manufacturer because of its expense. In war time, however, economics had to be thrown to the winds. He was satisfied that it was necessary for the suppliants to increase their plant so as to produce a larger output, and that they did increase it. They said that that plant was useless for producing anything else. That might be so, and they therefore made a claim against the Government based on an implied promise to give or procure, through the Ministry of Food, or such other Department as might be in control of the supply of saccharine, orders for permanganate at the arranged price in such quantity and for such period as would reasonably remunerate them for the expenditure on plant and raw materials.

Some of the business between the parties was carried on by correspondence; the greater part of it was done by conversations through the telephone. He had to make up his mind as to which of the witnesses he believed, and he gave most weight to what had been said by Mr. Chance, the managing director of the suppliant company, who kept a diary, and appeared to him to have a clearer recollection and to be the better man of business. It was impossible to find any such undertaking in distinct words in the correspondence. He was not satisfied that there was any such express contract as that suggested made orally between the suppliants and the Crown. The well understood principle to be applied was that, where there was no express contract and yet it was perfectly obvious that there was a contract between the parties, then a contract had to be implied from all the circumstances. Such a contract could only be implied, however, when it embodied the intention of both the parties to it. He was not satisfied that it ever had been the intention of the persons who represented the Government in those transactions that they would enter into a contract that the demands should continue for such a period as would reasonably remunerate the suppliants for all expenditure connected with the manufacture of permanganate. There was no implied contract to that effect.

His Lordship, however, found under another paragraph in the petition of right that there was an implied contract that the purchase of permanganate should continue for a longer time than it did, having regard to what was done by the Government. The Government wanted to save the consumption of sugar by the use of saccharine, and they directed the suppliants to supply a considerable quantity of permanganate to certain saccharine manufacturers. The suppliants contended that there was an implied contract that they should have proper and reasonable notice if the Government wished to terminate their arrangements with the saccharine manufacturers. He was satisfied that there must be implied such an agreement as would require a reasonable notice to the suppliants of the change in the policy of the Government.

The result was that, although he found that there was no implied agreement between the Crown and the suppliants, that the contract should continue until they had recouped themselves for all expenditure, he decided that there was an agreement that reasonable notice should be given, so that the company should not be left with a large amount of stocks on their hands, or with contracts which would hamper them in the ordinary conduct of their business. The suppliants, he found, had no notice of cancellation from the Government until January 18, 1919. Before that date they had proceeded with the manufacture of 50 tons of permanganate. It was reasonable for them to do so, as the process took about a month. It was also reasonable for them to lay in stocks of materials, and to make contracts for the supply of materials at fair prices, and they were entitled to something for losses on those contracts.

He left questions of length of notice and figures to an Official Referee, and made a declaration that "the suppliants were entitled to damages for the breach by the Crown of the implied promise to give reasonable notice before terminating orders for the supply of permanganate in the quantities and at the prices agreed." He granted the suppliants their costs.

Reviews

BIOCHEMISTRY. By Benjamin Moore. London: Edward Arnold. Pp. 340; 21s.

A most interesting book by the Professor of Biochemistry at Oxford "for students of honours schools and researchers." The topics treated include photosyntheses of organic and inorganic compounds, and the relation of iron to chloroplasts —largely a digest of Professor Moore's own work—biotic structure and energy, actions of cells, enzymes, secretions, chemical and energy transformations, and colloid and crystalloid equilibrium in living cells. The volume is written most lucidly and with, what is unfortunately only too rare in scientific books, an appreciation of the artistic.

Few of the chapters are at all exhaustively studied, but the reader is abundantly shown where fresh work needs to be done, and where old methods should be revised, whilst the number of problems suggested for research is legion.

Dr. Moore is frequently a philistine in the camp of the orthodox, but his arguments and apologia are so persuasive that it is just as well to remind the reader that many of the subjects discussed—for example, the functions of chloroplasts —are still *sub judice*. Further, as the author is not limited by the exigencies of an examination syllabus, and seeing that the content of Biochemistry is so varied, and the book of modest dimensions, it is obvious that he alone is judge of what he wishes to choose.

The reviewer, however, has frankly to confess that at times he has been puzzled to find the principle of selection. Thus, if it be necessary to explain on page 145 the significance of the double arrow in an equation as indicating a reversible reaction, why should such a word as "stereoisomer" be introduced on page 170 without explanation? Or, again, two whole pages (306, 307) are occupied with detailing the elementary chemistry of amino acids; we should have expected an honours student at least to have known this, and if not, why on page 223 are the "d and l" series of sugars quoted without any explanation or warning that the "d and l" in this case have not their usual significance? Similarly, three pages (179-181) quote the detailed mathematics for solving mono- and bimolecular reaction equations; if the "honours student and researcher" can understand the integration step involved, why occupy space with quoting the intermediate elementary mathematics, and if not, why not give the final result at once and devote the space thus economised to other matters of the highest interest?

Among minor details might be mentioned the following:— "Restored to *statu quo*" (p. 119) is neither good Latin nor good English; "to more or less retard" (p. 212) is a distinctly bad split infinitive; is it true that "enzymes begin to suffer rapid deterioration in all cases at about 50°C." (p. 34)?— the enzymes of certain snake venoms appear to be at least moderately stable at that temperature; on page 132 a suggested explanation of heredity is that the ovum possesses a distinct type of energy "attuned initially to the species of living creature to which the embryo belongs"—however novel a suggestion may be, is anything to be gained by theorising a speculation for which there is no evidence, and which is not patient of test or proof? The action of ultra-violet light on bacteria, as quoted on page 95, requires some slight emendation in view of recent work from Japan; a student would gather from page 223 that the "vast majority of enzymes" acts on *either* the "d" *or* the "l" stereoisomer, and not that the action is one of relative velocity, as is, of course, usually the case.

In the matter of spontaneous generation Dr. Moore follows closely on the lines suggested by Weismann in his Freiburg lectures of some 20 years ago—"the production of life lies not at the level of bacteria, but at a level of life lying deeper than anything the microscope can reveal" (p. 35).

A useful bibliography is appended to the volume though the list of books might have been extended with advantage, and seeing how much attention is devoted to photosyntheses, it is somewhat surprising that a book like Plotnikow's "Photochemistry" is not mentioned.

The author's work is one that deserves to be read carefully, not only by those for whom it is professedly written, but also by the large number of teachers engaged in instruction in biology. It is a book in a compartment by itself, and we venture the hope that it will be succeeded by a Volume II. Living matter and biotic energy are unique phenomena. Nature's laboratory knows no such reagents as dry aluminium chloride, or concentrated acids and alkalis; she works at temperatures below 50°C. and in very dilute solutions. In so far as we know, "it is only in terms of life itself that life can be expressed" (Haldane: Relativity), and "in biology we are primarily concerned with the end and not the cause" (*loc. cit.*). If Dr. Moore's stimulus does even nothing other than to remove the mechanistic obscessions concerning cell membranes and osmotic pressure that prejudice modern biological literature, it will have contributed much towards restoring the interpretation of cellular physiology to that truer basis and perspective from which modern Continental exponents have displaced it.

IVOR JAMES.

CHEMICAL DISINFECTION AND STERILISATION. By S. Rideal and E. K. Rideal. London: Arnold & Co. Pp. 313. 21s.

The authors of this book are to be congratulated upon having collected a large amount of information from various sources, and arranged it in a very readable form. The only complaint we have to make is that the title is not likely to suggest to the ordinary student many of the subjects dealt with in the text. The authors intend to interest not only the chemist, the doctor, and those immediately concerned in public health, but, by the inclusion of chapters on the preservation of timber and the means for fighting the natural enemies of the farmer and allotment holder, they make an appeal to a far wider circle of readers.

The first few chapters relate to the disinfection of air, food and water; many interesting results are given of the attempts which have been made to disinfect homes, hospitals and factories, and evidence is brought forward to show that many of the methods in common use are quite ineffective. The efficiency of the various substances used in the preservation of food is discussed, and considerable space is given to the description of methods of preservation by freezing and sterilization in various ways.

There is an interesting chapter dealing with non-bacterial parasites in animals and plants, which include such matters as the best methods for removing ringworm, the fly scourge, composition and value of sheep dips, fungicides, and so forth. Then follows a description of the methods of preserving wood, and afterwards a very full list is given of the various chemicals, inorganic and organic, which have been used or suggested as antiseptic or disinfecting substances. The chemical structure and properties of each substance, as far as they are known, are set forth, together with the relative disinfecting values.

The last chapter deals with methods of analysis and will be found to be of great value, especially to those who are not practised in bacteriological methods.

The book is well printed but contains no illustrations, not even the usual woodcuts of flasks or wash-bottles. There is an extensive bibliography at the end of each chapter and good subject and author indices at the end of the work. We heartily recommend the book to all, and especially to those who are practically concerned with questions of public health.

H. W. BYWATERS.

NOTES ON INORGANIC CHEMISTRY. By F. Francis, Ph.D., D.Sc. Bristol: J. W. Arrowsmith, Ltd. Pp. 244. 8s. 6d.

This book is intended for students attending the first year course in the University of Bristol. The notes are sometimes of rather a scrappy character, but as the author states that the book must be used in conjunction with a text-book and not as a substitute for one, this need not be regarded as a fault.

If the modern first year student is really able properly to assimilate all the philosophy discussed in this volume his mental training and capacity must be far in advance of that of a first year student of a generation ago. The book is excellent in itself, and contains a wealth of information concerning recent chemical theories and discoveries that will interest many students of a much older growth than the average first year student.

The subjects discussed include atomic and molecular theories, thermochemistry, velocity of chemical reactions, colloids, ionic equilibria, and various hypotheses concerning the nature of matter. Those who tire of theorising will find relief in the interesting references to industrial occupations which have benefited by the application of chemical knowledge. The utilisation of atmospheric nitrogen in agriculture, the influence upon steam generation of the various salts commonly present in boiler water, the behaviour of the oxides of carbon at different temperatures in the manufacture of water-gas and of producer-gas are among the subjects of great importance in industrial life which here receive due attention.

Those who wish to study chemical philosophy as expounded in the most advanced schools of the present day should find these notes which Dr. Francis has put together in book form very helpful; but it should be remembered that, as Dr. Francis himself rightly says, theories and hypotheses are essentially temporary. Many of the theories which are popular to-day will be rejected to-morrow.

H. F. H.

FORENSIC CHEMISTRY. By A. Lucas, O.B.E., F.I.C. London: Edward Arnold & Co. Pp. 268; 12s.

Mr. Lucas is director of the Government Analytical Laboratory at Cairo, and will be remembered as the author of a small volume dealing with legal chemistry and scientific criminal investigation which appeared early last year. The reception accorded the original book prompted Mr. Lucas to write something more nearly approaching a general text-book, with the result that the present volume is probably the only English publication of its kind. The author has, as far as possible, attempted to deal with the strictly chemical aspects of his subject, and has been careful not to encroach upon the medical side. As the title of his book introduces a somewhat uncommon expression, it will be as well to explain that forensic or legal chemistry may be defined as chemistry applied to the solution of the numerous problems which arise in connexion with the administration of justice. It is, in fact, chemistry exercised in the service of the law. Naturally, the subject is one of a particularly specialised nature, and the book will necessarily prove of every-day assistance to only a comparatively small circle. On the other hand, however, it deals with the chemical side of criminal investigation in a lucid and engaging manner, and it is the type of reading which should prove particularly absorbing to the pure or industrial chemist, who probably has no conception of the intricacies involved in the tracking down of criminals. The forensic chemist must essentially be endowed with characteristics which are not necessarily demanded in the more commonplace branches of this science; he must be specially trained in observation and deduction, and learn to become particularly sceptical of outward appearances. The modern criminal is becoming so scientific—not only in his work but in the means he adopts to escape detection—that a highly skilled scientist is needed to cope with him. In the words of the author, one must to-day "set a scientist to catch a scientist." M.

Drying of Pulverised Coal

To the Editor of THE CHEMICAL AGE

SIR,—I would like to inform the writer of the letter on this subject in your current issue, that there are dryers working in America on pulverized coal other than what he mentions. The Buckeye Dryer Co., Inc., U.S.A., have two dryers working very successfully at the British Columbia Cement Co. in conjunction with the Raymond Pulverizing Mills, also at the Ohio Brass Co., Ohio, and the American Malleable Co., Akron, Ohio, and I understand that some of these have now been working for a period of four years and are giving every satisfaction. I also understand that with the Buckeye Coal Dryer it is possible to dry coal without considerable dust and waste, and that their special design of dryer eliminates the possibilities of fires and explosions, and that the finished material is discharged dry and in a cool condition, making it possible to store without the usual danger of heating and sweating.—Yours, &c.,

H. T. WATSON, Chemical Engineer.

Widnes, Oct. 15.

Chemical Industry Club

A Message to New York Chemists

AT the annual meeting of the members of the Chemical Industry Club on Monday evening, presided over by Dr. Hodgkinson, a letter was read from Captain Goodwin, now in Paris, stating that as representing the club during the recent visit to Canada and the United States, he conveyed to the members of the Chemists' Club at New York a message of greeting from the Chemical Industry Club. This message was received with great satisfaction by the members of the New York Club, and he was daily expecting an official reply. The text of the message from the Chemical Industry Club, read by Mr. H. E. Coley, was as follows:—

TO THE CHEMISTS' CLUB, NEW YORK.

"The chairman and the committee of the Chemical Industry Club, London, desire on behalf of the members, on the occasion of the visit to the United States of representatives of the Society of Chemical Industry, to send their very cordial greetings to their colleagues of the Chemists' Club of New York.

"Both institutions are united in a desire to cultivate and provide for the social side of chemical industry and chemical science, and by opening their doors to visiting members of either club have already done something and may yet do more to promote the acquaintance and consolidate the friendship of the chemists of both nations.

"At the present moment the greetings we send through Captain Goodwin have more than a purely personal and domestic interest. They are an indication of the sincere desire on this side for increasing friendship and good understanding between Great Britain and the United States, as a guarantee not only of the progress of the two great English-speaking nations, but of the peace and well-being of the world.

"This visit takes place at a time when all the influences that make for international friendship need to be cultivated, and among the most stable bonds of unity is the common service of mankind through scientific research and the application of its results to industry. On this basis the scientists, and especially the chemists, of your nation and ours may find common ground in their sympathies, aims and work. Both can gain nothing but good for a better acquaintance and closer association with each other, and in sending these words we desire you to accept them, not merely as a courtesy, but as representing our sincere desire for ever-increasing friendship and co-operation between Great Britain and the United States."

Satisfaction was expressed with the terms of the message, and with Captain Goodwin's services.

Business of the Club

The annual report of the committee, already published in THE CHEMICAL AGE of October 15, was presented by the chairman, and adopted.

The meeting unanimously re-elected Mr. H. E. Coley as hon. secretary, and Captain C. J. Goodwin as hon. treasurer; in addition Mr. W. Cullen was appointed assistant hon. secretary.

There was no contest for the committee. Four of the retiring members—Mr. Cunningham Craig, Dr. Dehn, Dr. Ormandy, and Mr. R. B. Pilcher—were re-elected, and the following were elected to fill the four remaining vacancies: Dr. Rule, Dr. Tripp, Mr. Harley Wright and Mr. Melville Smith.

In the absence of Captain Goodwin, Mr. Coley presented the financial statement, which showed a balance in hand of £162.

The committee submitted for the consideration of the meeting a new rule providing that in future the chairman of the Executive Committee should hold office for one year only, and should not be eligible for re-election until after the lapse of one year. This was adopted, with an addition moved by Dr. Rule, providing that the retiring chairman should be given the office of immediate past chairman, and should hold that office for one year after his retirement, with a seat on the committee for that period.

Reference was made to the valuable services of Dr. Hodgkinson, who is retiring from the chairmanship of the executive after three years' service, and a very cordial vote of thanks was passed to him. During the discussion a number of suggestions were made for increasing the membership and adding to the usefulness and attractions of the club.

Hydrogenated Phenols and Alcohol Substitutes

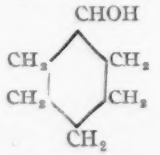
Uses in the Soap and Textile Industries

IN his remarkable and stimulating address at Montreal Sir William Pope warned British chemists from following too closely the almost feverish activity of Germany in the direction of organic synthesis. In that country, with no colonial possessions worth speaking of, such a policy is necessary, and it must be admitted that the Germans have met with considerable success in the manufacture, by artificial methods, of various products for which they are otherwise entirely dependent on foreign countries, *e.g.*, indigo, rubber, camphor, &c. The British chemical industry is in a very different position; it has the illimitable resources of the British Empire at its disposal, and its policy should therefore rather lie in the direction of improving the natural methods of production in the field instead of paying too much attention to synthesis in the laboratory; for, however much the latter may be perfected, it falls short of the natural method.

As already stated, Germany has met with a considerable measure of success in synthesising products the natural supplies of which were cut off by the war. Two further examples of this have been recently described in the German technical Press. Both of them are applications of catalytic hydrogenation, which may truly be said to be pursuing its victorious career from one important field of chemical industry to another. Hydrogenated oils have practically revolutionised the soap and fats industry; hydrogenated naphthalenes have provided another cheap and efficient solvent, tetralin; and now we have further valuable products proclaimed in Germany under the name of hexalin and methylhexalin, or hydrogenated phenols, which are said to be particularly useful as substitutes for Turkey red oil and for the manufacture of textile soaps generally, also as substitutes for alcohol. This seems a further important development in the large family of coal-tar products, to which there appears to be no limit.

The possibility of obtaining such alcoholic products with higher boiling points extends their field of usefulness beyond that of the ordinary alcohols, especially in the soap industry and the manufacture of textile soap solutions. It is well known that the so-called castor-oil soaps or Turkey-red oil preparations owe their great value in the textile trades to the fact that, unlike the soaps of ordinary fatty acids, they are able to dissolve hydrocarbons and their halogenated derivatives, mineral oils, &c. This valuable solvent action is largely, if not entirely, due to the presence of an alcohol group in the polymerised castor-oil molecule; and such Turkey-red oil preparations are in effect alcoholic soap solutions. Germany, of course, was not able to import any castor beans or castor oil during the war, and the oil is still very difficult to obtain; and, in order to be as independent as possible of foreign sources in this as with other raw materials, attempts were made to find adequate substitutes. Ultimately the Tetralin Vertriebsges, of Berlin-Grunewald, already noted for their new solvent, tetralin, placed on the market a preparation under the name of hexalin, or hydrogenated phenol, which they claimed had alcoholic properties and, when combined with ordinary soaps, was a perfectly good substitute for castor-oil soaps. It forms the subject of a pending German patent application, F.44,380, IV./23c.

The product (cyclohexanol) obtained by hydrogenating the pure crystalline phenol (carbolic acid) has the formula



and is an oily liquid which, when chemically pure, boils at 160°C., and has a specific gravity of 0·945. It is therefore readily miscible with water. By hydrogenating the cheaper crude cresol a mixture of three isomeric methylcyclohexanols is obtained, having similar properties but a somewhat higher boiling point, 170-180 deg.

The new products form clear solutions with aqueous soap solutions, even in the presence of a large excess of water or alcohol, and these solutions have powerful solvent and emulsifying properties with all oils, fats, resins, hydrocarbons, dyes, &c., as well as a very powerful cleansing or detergent action exceeding that of ordinary soaps. The hexalin may be incorporated directly with the soap when the soap is made, whether it be a hard soda soap or a soft potash or ammonia soap. The following soap charge is suggested: 500 kg. olein, 200 kg. potash lye of 50°Bé, 600 kg. hexalin, and 400 kg. water. These constituents are stirred up together, and if desired, a concentrated ammonia solution may be added. Also hard soaps may be prepared and can absorb 10 to 20 per cent. of the solvent without materially reducing their hardness or solidity. Such soaps have a very attractive appearance, resembling ordinary soaps with a high glycerine content, and the odour is agreeable, similar, in the absence of any additional perfume, to menthol or camphor. It is advisable to incorporate the hexalin in these soaps mixed with an aqueous potash soap solution, otherwise the unmixed alcohol necessitates a considerable amount of stirring.

These new soap preparations have been tested in the Prussian High School for the Textile Industry, and have been found very useful in wool-washing and in chemical cleaning; also for general washing and laundry purposes, and no unpleasant smell is left in the articles treated. The fact that the hexalin soaps can be combined in almost any desired proportion with hydrocarbons and their derivatives greatly extends their field of usefulness, and several valuable preparations either in the form of solutions or emulsions can be obtained. Other uses for the new soaps are indicated in dyeing, metal working, lubrication, manufacture of boot and metal polishes.

Dr. Richard Hueter, of Dessau, has recently published further details of the manufacture of hexalin and methylhexalin soaps. Some of these soaps have been placed on the market under the trade names of Savonade, Texapon, &c., and are said to be in large demand by the textile industries.

Lubricating Oils from Coal Tar

Recent German Practice

DURING the war the Germans, of course, had to depend chiefly on their own resources for lubricating oils, especially for the railways, and appear to have brought to a fairly high stage of perfection the manufacture of lubricating oils from coal-tar distillates. In 1918 about 50,000 tons of such oil was obtained from this source, of which the railways alone used 15,000 tons, and numerous technical difficulties in the way of evolving a satisfactory process on a large scale were overcome.

The coal-tar was first of all distilled in large vessels of 20 to 50 tons capacity and split up into light oils, heavy oils and anthracene oil, the residual pitch being used for briquetting or road-making, and to some extent as an insulating material. The light oils of specific gravity about 0·95 consisted chiefly of benzol hydro-carbons used in dye manufacture and for motor fuel. The next group of middle or intermediate oils had a specific gravity of approximately 1·03, b.p. 240 deg., and contained crude naphthalene from which pure naphthalene for the dye industry was obtained by crystallisation, also naphthalene crystals in the form of flakes. The heavy oils of specific gravity 1·08 could be used partly as fuel and partly as creosote oils.

The high boiling anthracene oil from which the lubricating oil is obtained distils over between 280 deg. and 360 deg. and has a specific gravity of about 1·1. Anthracene, phenanthrene and carbazol were next obtained in solid form by cooling and could be utilised for the manufacture of carbon black and solid lubricants, or the anthracene could be specially treated for the manufacture of alizarin dyes. A clear oil is obtained by filtering from the solid constituents, the low boiling fractions still present are removed by further distillation, and the so-called tar-fat oil is finally obtained by thickening and polymerisation. This is a lubricating oil of viscosity 2 to 2·5 E. at 50°C., and is now very extensively used in Germany. The specific gravity of this oil is 1·12, its solidifying temperature is below −10°C. and its flash point about 140°C. Its fractional distillation is as follows: up to

300 deg. 5 per cent., 320 deg. 25 per cent., 340 deg. 50 per cent., 360 deg. 70 per cent., 380 deg. 85 per cent., 400 deg. 95 per cent.

A peculiarity of this oil is that, in the cold or in a supersaturated condition, a portion of the anthracene hydrocarbons, *e.g.* anthracene, phenanthrene, fluorene and carbazol, separate out in solid form. It is difficult to avoid this always, especially in cases where the oil during transport has to pass through localities which are colder than its place of origin, and the oil orifices are likely to become clogged or quite choked up if not carefully watched.

It is claimed that this and other difficulties have been surmounted in a lubricating oil placed on the market by the Verkaufsvereinigung für Teererzeugnusse (Tar Products Sales Corporation), of Essen, Germany. This oil is manufactured, by a process protected by German patent No. 330,970, from best quality fatty tar oils, and owing to its high lubricating power, high solidification point, and almost entire absence of odour it forms a very good substitute for aliphatic mineral oils in every respect. The process consists briefly in converting the anthracene hydrocarbons, by dehydration with sulphur, into viscous substances of an entirely different character, completely soluble in the oil and no longer crystallisable. There is no sulphur enrichment of the oil, for the sulphur is all removed in the form of hydrogen sulphide. By conversion of the crystallisable compounds the solidification point of the oil is considerably raised, so that it remains perfectly stable in the cold. These lubricating oils are particularly suitable for lubricating shafts and other machine parts, except those exposed to very high temperatures, in which case the viscosity is insufficient. The new lubricating oil has been given the trade name of "Ol Ess."

Numerous tests have been carried out with Ol Ess and ordinary lubricating oils under varying conditions of temperature, &c., and are described by F. Schreiber of Essen in the *Zeit. f. Ang. Chemie* for August 16, accompanied by diagrams of friction and temperature curves.

The oil has been used by the railways for the past year or two both on passenger coaches and goods wagons with satisfactory results. It is considerably cheaper than imported mineral oils, so much so that, assuming an annual consumption by the railways of 20,000 tons, a saving of 10 to 15 million marks is claimed. But beside the railways it should have a wide field in usefulness of industry generally.

German Chemists' War Work

A *Times* correspondent is now going through Germany inquiring into the arrangements being made, according to rumour, by the militarist party for restoring the military organisation of the country. The first article is described as "showing how Germany is concealing armies under civilian guise, how her chemists are carrying on research into poison gases and bacteriological possibilities of destruction, and how her industries are employed in devising engines of war, among which is a formidable machine-gun worked by electricity from afar."

In reference to chemical activity the writer states: "Factories are at work at high pressure on potential war accoutrement and material, I have heard the conviction expressed by more than one authority that the explosion which devastated the Badische Fabrik at Oppau would not have occurred had no experimental work connected with the manufacture of engines of war in some shape or form been indulged in there. Chemical research, and even bacteriological experiments, with war as the ultimate end in view, are being carried out in universities and laboratories with that intensity and thoroughness that marked pre-war preparation. Entirely new implements and methods of destruction are being sought."

As an example, mention is made of new machine guns, weighing some 22 lbs., capable of spreading 2,000 rounds per minute in a complete circle from each of its three barrels, and operated electrically by a machine gunner possibly half a mile distant.

Considerable damage was caused by a fire at the premises of PILCHERS, LTD., paint and varnish manufacturers, Morgan's Lane, Tooley Street, S.E. 1, on October 15. The building, which consisted of four floors and a basement, was practically gutted.

Chemical and Dyestuff Traders

Importer's Claim to Drawback

IN a circular issued to members the Chemical and Dyestuff Traders' Association announce that among the subjects taken up with the Customs Authorities is the question whether the Act allows an importer to claim drawback if the goods on which the duty has already been paid are afterwards re-exported. In their official reply the Customs Authorities state that section 12 (1) of the Act provides that, if it is proved to the satisfaction of this Board that duty has been paid under the Act in respect of any goods, and that the goods have not been used in the United Kingdom, a drawback equal to the amount of duty paid is allowable on the exportation of the goods as merchandise. It will be observed that drawback is payable only on goods which have paid duty on importation and have not been used in the United Kingdom. If therefore the goods exported are not the same goods as those which paid duty on importation no drawback is payable.

Chemicals for Agricultural Purposes

The following questions were submitted to the Board of Trade :—(*a*) Are chemicals that can only be used exclusively for agricultural purposes definitely excluded from the operations of the Safeguarding of Industries Act 1921? (*b*) If so, can traders import from the Continent, with the assurance that no import tax will apply, products to be used exclusively for agricultural (or veterinary) purposes, even if such products contain chemicals that if not for such use might come under the incidence of taxation under the Safeguarding of Industires Act?

The answer was that all fertilisers in their crude state are not liable to duty, but that the Board of Trade could not say all products to be used exclusively for agricultural (or veterinary) purposes would be duty free as some might be in their especially pure state and so would come under fine chemicals. In such cases they would have to be specially dealt with.

Importation of Reparation Dyestuffs

Correspondence has taken place between the Association and the Board of Trade respecting the Government scheme of importing and distributing German reparation dyestuffs. It was pointed out by the Association that a wide range and large quantities of German dyes and colours were being freely offered all over the country by a particular firm at prices which made it impossible for British merchants to compete and obviously more than neutralised any benefit to British makers that might arise from recent legislation, and it was contended that this practice amounted to unfair competition by the Board of Trade.

In their official reply the Board state that "as is generally known, considerable quantities of dyestuffs were obtained from Germany under the Reparation Clauses of the Peace Treaty, in response to requests from the colour using industries, and on the advice of the Trade and Licensing Committee (on which manufacturers and users were alike represented) at a time when there was appreciable difficulty in securing adequate supplies of the dyestuffs required in this country. Unfortunately, owing to the complete change in trade conditions which occurred shortly after the supplies became available the quantities so obtained were not absorbed, and a proportion still remains in stock."

"The Board," the reply continues, "have given careful consideration to the question of the distribution of this surplus, in consultation with dye users and dye manufacturers, and as a result decided that it is preferable in the interests of the trade generally that steps should be taken to dispose of these supplies as rapidly as possible, even though in some cases this may involve direct competition with British products of a similar nature. It was obviously advisable that for reasons of both efficiency and economy the importation and distribution of the reparation dyestuffs should be concentrated in one agency, and in their selection of the particular agency the Board were guided by the recommendation of the Trade and Licensing Committee mentioned above."

In commenting on this reply the Association add that they are authorised to state that the Board will welcome the co-operation of members of the trade in the disposal of their present stocks of reparation dyestuffs. It is therefore open to all members of the Association who are interested in the matter to apply direct to the Secretary of the Board of Trade with a view to obtaining any dyestuffs or colours that they desire.

Chemical Industries of West India

Some Recent Developments Described

EXTRACTS from the Annual Report of the Director of Industries of the Bombay Presidency for the year 1919-20 are given by the *Indian Trade Journal* as follows :—

Up to the middle of October, 1919, Mr. T. J. Walke was able to devote a certain amount of time to fishery work in addition to his other duties in the Salt Department, but from that time onwards he has worked at Karwar as a full-time officer of the Department of Industries. Mr. Walke reports that he has been experimenting with sardines for the purpose of obtaining oil and also guano. The oil so far produced has been of a very good quality and has been favourably reported on by certain medical officers as a possible substitute for cod-liver oil. It is considered to be more pleasant to drink than cod-liver oil, but the question whether it is equally well provided with the nourishing and curative properties for which cod-liver oil has obtained such a reputation is still unsettled. The fish guano has been very favourably reported on by the Agricultural Department, and so far it appears that there are good prospects of developing a profitable industry by the manufacture of oil and guano. It is encouraging to note, therefore, that land at Majali and Mallukurva has been taken up for the organisation of fish-oil factories by private enterprise.

Preparation of Sulphuric Casein

Pending the report of the Committee which has been touring India to consider the question of forming an Imperial Service of Chemistry, it has not been possible to bring forward any definite recommendations for setting up a staff of chemists with a suitable laboratory and equipment. The development of industries in this Presidency depends to a very large extent on chemistry, and the chemists and engineers of the Department will have to work in close touch with each other. Dr. A. N. Meldrum and Mr. D. M. Gangolli have continued to do work for the Department and have published the first bulletin of the Department dealing with the preparation of sulphuric casein. Dr. Meldrum is continuing work on this important subject and promises a further bulletin dealing with practical methods for producing casein with a very low fat content. The object of this research is to find out satisfactory methods by which a really pure form of casein can be produced on a commercial scale.

There is a considerable amount of casein produced in this Presidency, much of it being made in a very crude manner, and consequently the price obtained is low and often quite unsatisfactory. It is thought, however, that if simple methods can be worked out for producing a really high-grade casein, it will become a profitable industry in districts such as Gujarat, where milk can generally be obtained in large quantities. It was intended to open a small demonstration factory at Anand, where the manufacture of a good quality of casein could be carried out, so that villagers and other people who now make casein by crude methods could see the whole process and receive help in their difficulties. Unfortunately, owing to the scarcity of milk, the proposal had to be deferred, but Dr. Meldrum intends to carry out this idea as soon as circumstances permit.

Extracting Bromine from Bitterns

Mr. A. J. Turner, with his assistant, Mr. M. M. Koppikar, has continued his work in connexion with the Kharaghoda bittern problems and has brought out bulletin No. 2 on the "Utilisation of Bitterns." He is continuing this research and has produced a sample of epsom salts which holds out great promise. In addition, Mr. Turner has investigated the possibility of obtaining refined salt from ordinary salt crystals in an economical manner. The results being quite favourable, a plant has been designed by Mr. T. S. Dawson, for the Pioneer Magnesia Company, which it is hoped will be constructed and working in the coming cold weather. The extraction of bromine from bitterns at Kharaghoda and Aden has also been investigated, but opinion appears to be that owing to the small demand for bromine now that the war is over, the possibility of producing bromine in paying quantities from these sources is not very hopeful.

Mr. Turner has also carried out a large number of analyses of oil-cakes for the Department and has made an examination of "crude soda liquor" obtained in Sind, with a view to producing a good grade of washing soda. He has also visited several factories and advised them with regard to their difficulties. Considerable help has also been given to oil mills in the vicinity of Ahmedabad in analysing their oils so that they can market them according to quality.

Wood Distillation

This section concludes with a note on the inquiries and the interest which has been taken in the subject of wood distillation. The idea of distilling wood and obtaining a large number of valuable by-products has appealed greatly to industrialists with capital. The question has been investigated very thoroughly by experts who are familiar with the processes and working of the plant, and the Forest Department has also afforded a large amount of information regarding possible areas where timber could be obtained in quantity and at a reasonable cost. Unfortunately, the conclusions arrived at are that, as far as this Presidency is concerned, the installation of a fully equipped plant would not be a successful enterprise. The amount of wood required is a very serious item for a plant which is to be worked on a commercial scale, and it does not seem possible to find an area where such supplies will be constantly forthcoming and where the wood can be obtained at all times of the year in a sufficiently dry state. Now that the war is over, the market for by-products has fallen away, and unless India is able to take up and make use of all the by-products it is not considered that it will pay to produce them for export only. There is, however, another side of the problem which requires investigation. In India the demand for charcoal is increasing rapidly and the methods of production are crude and inefficient. It appears, therefore, that there may be an opening for wood distillation, the primary object being to produce charcoal of good quality at a reasonable price. By-products will probably be neglected, although it is possible that a plant might be designed to deal with one or more particular by-products for which there is a market, without going into the expensive refinements for the complete distilling plant.

Power Alcohol

The problem of supplying cheap power for industrial concerns is now engaging attention all over the world. For many years the small industrialist has made use of the steam engine or the oil engine, the latter using refined or residual oil. The user of the oil engine is faced with the much higher cost of oil fuel and the prospects of these prices falling are not in any way favourable. There is an almost universal movement in the direction of using refuse or crude oil for firing boilers. This method of using oil is not economical, but it has been forced on to boiler users, with the result that the price of oil has increased, will go on increasing, and is not likely to decrease. The consequence of this is also found in the scarcity and increased cost of the lighter products of oil distillation, such as petrol. The idea of finding some cheap substitute to take the place of petrol has aroused a large amount of interest. Power alcohol has become a popular cry and many inquiries have been received regarding the possibilities of obtaining materials from which cheap alcohol can be manufactured.

Alcohol from "Mahua" Flowers

In this Presidency, the proposal to make use of "Mahua" flowers for producing cheap alcohol has been thoroughly looked into, but owing to the difficulty of collection, price, and the short season during which the flowers are available, it is quite certain that a large distillery could not be made to pay or even compete with petrol at its present price.

A plant for producing alcohol and ether (the mixture which is being used successfully as a substitute for petrol) is being completed in Hyderabad State (Deccan). This plant will distil alcohol from Mahua flower, but it is not known at what cost the mixture will be sold. An investigation of all other possible sources of supply has led to the conclusion that until big supplies of molasses are available from sugar factories, any proposal to distil commercial alcohol will not be successful. It must not, however, be forgotten that there is a remote possibility of discovering some rapidly growing plant which will flourish on waste lands and produce either flower, fruit or tubers from which alcohol can be made at a cheap rate. It may be noted in passing, however, that Java has enormous supplies of waste molasses, some of which are used for pro-

during alcohol at the present time. Alcohol from Java is imported into India at a cheap rate; so any proposal to distil alcohol in India on a large scale will have to reckon with competition of imported alcohol from Java. One of the remaining sources of power which has been curiously neglected, possibly owing to the counter-attractions of the oil engine, is the suction gas producer, working a simple gas engine.

Alizarine Dyes

A consignment of 200 odd tons of German reparation alizarine dye was allotted to India in 1919. At that time the import of dyes into India was prohibited, and there was a considerable amount of suffering among dyers owing to the extreme shortage of alizarine dye, the use of which is very popular among small dyers. It was decided that the reparation alizarine dye should be sold at a controlled rate of Rs.1-3-0 per lb., and the distribution was undertaken by the Director of Industries, Bombay, with the assistance of Latham, Abercrombie & Co., who actually handled the casks and distributed them according to instructions. Owing to the uncertainty as to the composition of the dye, it had to be repacked and tested in England before despatch, with the result that the consignments were received in small quantities and the total quantity was insufficient to meet the big demand. Efforts were made to distribute the dye throughout India in as fair a manner as possible, but disappointment was inevitable in many cases. But owing to the fact that a single cask could be resold at a profit of at least Rs. 3,000, extreme precautions had to be taken to see that the distribution of the dye was kept under strict control.

An additional supply of English-made alizarine to the extent of 25 tons per month was also promised, but unfortunately none of this has been received.

India's share of reparation dyes other than alizarine is being secured by the Indian Trade Commissioner in London. Great difficulty is, however, being experienced owing to the fact that the dyes have been received from Germany without labels or marks, and this necessitates careful investigation to ascertain the contents of each cask. Arrangements are being made to ship the dyes to India and distribute them as fairly as possible, but in this case also it is evident that the quantities are really insignificant, and it will be impossible to meet the requirements of everybody. Great interest is being taken in dyeing, and the results so far obtained are distinctly encouraging. The ancient industry of calico printing which is still carried on to a very considerable extent in Ahmedabad and other towns in Gujrat, has also been investigated.

British Glues and Chemicals

AT the first ordinary general meeting of British Glues & Chemicals, Ltd., held on Thursday, October 13, Mr. T. Walton, who presided, said that the company had, in common with practically every other manufacturer and merchant in the country, suffered heavily by the severe drop in prices which had taken place during the trade depression. The balance of profit and loss account, £149,872, was subject to excess profits duty, corporation profits tax, and income-tax, and to capitalisation, by reduction of capital assets, of the proportion of profits earned prior to incorporation, when the figures had been ascertained. Referring to the acquisition of the business of the Lomas Gelatine Works, Ltd., at Plymouth, he stated that this had given the company a works in an important section of the country not previously covered by its operations. During the period of acute depression which had latterly prevailed the company had had to build up a large organisation and to weld a number of separate companies into one complete whole. In the circumstances, they had reason to be thankful that the company had finished a period of great difficulty with such a result as that now submitted. There had recently been some improvement in their markets, but only the most efficient management, the utmost regard for economy throughout, and continued improvement of industrial and trading conditions could bring the results they desired. The company's prosperity was of necessity dependent upon the general prosperity of trade, and he was convinced that British trade could regain its former prosperity by all round hard work, resulting in production in abundance and at such prices as would stimulate demand. A return to something approaching normal trade and trading conditions would give them every hope of a bright future.

British Chemical Trade

Government Policy and Merchant Interests

ON Tuesday the third annual general meeting of the British Chemical Trade Association was held at 80, Fenchurch Street, London, the President (Mr. H. H. Hughes) in the chair.

The accounts, it was stated, showed the Association to be financially sound with a credit balance for the year of £46 1s. 4d.

The Chairman, in reviewing at length the work of the Association during the year, said that Government restrictions continued to hamper and impede trade, and the majority of the work had been in connexion with these matters. The Dyestuffs Act reintroduced the objectionable feature of making an applicant for an import licence divulge to the Licensing Committee (which was mainly composed of trade interests) the name of his buyer. The Association suggested to the members that they should withhold this information when first applying for a licence and only furnish it when requested to do so, and only then on the distinct understanding that, when submitted, the licence would be granted. The Committee considered that there was no good reason for the Advisory Committee to demand this information before considering an application for a licence. The Dyestuffs Sub-Committee had lately been giving their attention to the prohibition, except under licence, of the importation of dry colours which contained from 1 to 2 per cent. of aniline only. The Committee considered the prohibition of these materials a very harsh ruling, and it was hoped that some modification would be obtained. During the year 98 arbitrations had been held in the rooms of the Association, and generally under their rules of arbitration. The German Reparation Act had been the cause of a great deal of trouble and inconvenience to members. The members had been kept informed of the latest departmental rulings—which were changing almost daily—and the Association was instrumental in clearing up many cases of delay. By the passing of the Safeguarding of Industries Act the chemical merchanting trade had been badly let down, and the enterprise of traders grievously injured. The issue of the "key" list under Part I. of the Act was directly contrary to the professed intentions of the Government. It was clearly stated that the "key" section would apply to essential industries in the country that were in a weak and backward state, and therefore required some protection, and it was further defined that essential industries were those whose continued existence was imperative to the safety of the nation. The Government therefore had no justification for including under the heading of "key" industries a large number of products which were not made here, and many others which could not be termed "key" products. Had the Government taken the opinions of the trade which was so vitally affected by the Act, the present unsatisfactory position would not have arisen. The many attacks that had been made, and would continue to be made, on the rights of merchants to trade, and even to exist, made it very important that the Association should not only continue to be as active as ever, but also to increase its power. He asked every member to make a point of obtaining at least one new member.

Mr. Hughes was re-elected president and Mr. A. J. B. Arnold hon. treasurer; and Mr. Dexter was elected to the new office of vice-president. There-elected members of the committee were Messrs. W. Dexter, S. J. C. Mason and F. W. Powell. The election of Mr. A. Connell and Mr. H. A. Berens, which had taken place during the year, was confirmed.

Mr. Fox asked whether the negotiations with regard to amalgamation with the Chemical and Dyestuffs Trad rs' Association had been completed.

The President said they were closed so far as their Association was concerned. If any further action was taken, it must come from the other side.

The question of the increase of the subscription was also dealt with, but it was decided that it should remain as at present.

ALUMINIUM CORPORATION.—At the annual meeting held on October 10, Mr. K. M. Clark, who presided, said that it had been found impossible to complete the accounts in time for the meeting. The directors were satisfied that the profits for 1920 justified the payment of the preference dividend. The meeting was adjourned, pending such time as the board were in a position to submit accounts.

The Capitalistic System*

By Mr. E. J. P. Benn, C.B.E.

II

PROFITS lead us to the question of incentive. We are continually told that it is a horrible idea that we should depend upon the incentive of greed, which according to the wonderful orators who are going to abolish the system, is the leading force behind industry and trade. That is a very low view of the human race. But is it really greed that makes it necessary for us to have profits? I, in my wisdom, think I would like an apple. I have seen an apple and tasted an apple and it occurs to me that it would be a good idea if I could get an apple. I inquire into it and find that in order to get an apple it will be necessary to dig a hole, to plant a tree, to graft and prune and manure and water for perhaps a couple of seasons, at the end of which time, if I am lucky, I may get a nice apple. Well, we will assume that acting from this base motive of greed I determine to go through that process, and at the end of the time I secure an apple. It is perfectly certain the apple will be somewhat below my expectations, but still, I have got it. At that stage there comes along a neighbour who says, "Oh, look here, I have the right to maintenance; half that apple is mine." Being a good, charitable, easy going sort of chap, I say, "Very well, you haven't got an apple; I have; here's half of it." So far so good; the story is working extremely well. But then arises the question of another apple. Now two years ago I was in two minds as to whether it was worth while to bother with the apple at all; when I got it I was certainly doubtful as to whether the thing was worth the trouble; at any rate, it was not as good as I thought it would be, and now I only get half. I say at once, "The next apple the other chap can grow! It certainly is not worth while for half." My neighbour presumably takes the course he did before and leaves it to me, and there is no second apple.

That little apple story, I submit, is literally true, and has actually happened within the last few years in Russia. It will happen here, *is* happening to some extent here, and will happen to an ever increasing extent so long as we go on tilting at the natural order of things, which is called the Capitalistic System.

There are four elements which are essential to success in industrial matters, four elements which are inseparable one from the other, and which must always go together. They are: High profits, high wages, high production, and low prices. These four things you will, I believe, find in every instance where you can point to a conspicuous or a real industrial success. In a free market the profit is the cheapest of the items that go to make up the cost of an article. Profits may be defined as a commission on economy. No form of control yet discovered has proved half as economical as the most rapacious profiteer. Profit might be defined as the reward of service gladly given of its own free will by a satisfied public to those who have rendered it the best service.

Now may I pass from profit to interest, a kindred subject, but rather different. We hear a good deal about interest, usury, high dividends. It is quite essential from your individual point of view, and from our point of view as a community, that each of us, or most of us, should save; something must always be saved. You cannot get a loaf of bread unless somebody has had the wisdom to save a little of last year's wheat. Interest is nothing but the measure of the inducement necessary to make you and me save. You will never be able to secure by way of interest more than the lowest rate which is acceptable to the whole of the capitalists of the world in open competition. The theory that it is possible to do without interest is unthinkable if your intention is to keep the human race alive.

I would not have you think that I am of opinion that everything is perfect in a perfect world. I am merely talking of the Capitalistic System. Our blessings may be attributed to what is called the System, but our troubles must, I submit, be placed elsewhere. Supposing that the system can be shown to be at fault, there are better cures for measles than murder. There are certain injustices and troubles which are always attributed to Capitalism, and I will give you one or two of these. The most obvious is the case of the learned man of science, on whose brain, maybe, the health of the world depends. He finds it difficult to keep body and soul together on some miserable pittance of a few hundred a year. Side by side with him you get our friend Charlie Chaplin, at whose feet all the riches of the East and West are spread. But that has nothing to do with the Capitalistic System. That only shows how perfectly the Capitalistic System works. The System merely interprets, in economic terms, public opinion, and the horrid fact is—the sooner we face it the better—that we, the public, actually prefer Charlie Chaplin to the Doctor of Science, and the relative wealth of each is the exact measure of our estimate as a public of the value of the two men to us.

The charitable in every land are rushing to the assistance of Russia, and no doubt will be able to do something to delay the death of a few of the 20 or 30 millions starving and dying in that unhappy land. But no good can come by hiding from ourselves the ghastly truth that Russia has destroyed the delicate mechanism upon which she and all of us depend, and that by that act she has automatically annihilated the bulk of her population. A little charity may delay but cannot prevent the inevitable end. Now that is a very hard thing to say, but I want to put it to you that if we are really anxious to help Russia, we of the rest of the world, the only way that we can do it is to go to work with a will and a heart, and get the wheels of Capitalism running so smoothly and rapidly that we shall be able to absorb some of the surplus population which Russia, whether she likes it or not, or whether we like it or not, must allow to die or export.

You can bring it nearer home to us. In 1801 England and Wales had a population of a little over 8 million people, a large proportion of them living in a condition of squalor and poverty which can scarcely be realised to-day. In 1921 this little land, England and Wales, has a population of 42 millions, an increase entirely due, I submit, to the operations of the Capitalistic System.

If we decide that the System is such that it must be abolished; if we decide, at any rate, that we will not work it, that it is not worth working, then do let us be honest with ourselves—let us face the fact that it means a return to the eight millions of population or less which we had in this country when we had to rely upon our own resources.

My last point is this: our friends of the Left, who are so fond of railing against the System, are equally fond of the use of the word "Service." There is a good deal of talk about Service. Everybody with a patent way of doing things, or a patent way which he imagines would get things done, talks of Service, and for my part I confess that six months ago I had formed a hazy sort of opinion that Service and Socialism were synonymous terms. You may, therefore, imagine my astonishment on landing in America in the spring to find that in that land of the Almighty Dollar, that home of individualism and capitalism, the word Service is met with at every street corner, in every newspaper column, in every sermon and speech that one hears. I found it a little difficult at first to associate the idea of Service with all those ideas which are associated with the United States and the Dollar. But I rapidly came to the conclusion that our American cousins, being sound, practical economists, are right, and that they understand what service is. They know how to value service, and they realise that the only person who is qualified to express an opinion about a service is the person to whom it is rendered, not the man who gives it, and that through the dollar the person to whom the service is rendered can most surely express his opinion of that service. Thus you get a mixture of dollars and service which produces the condition of affairs which you find in that new world.

I look forward to the day when we shall wake up from our present lethargy—I mean we who embrace Capitalism—and shall undertake a great campaign to save this dear old country from the downward path upon which, in my judgment, she is now headed; a campaign in which Trade Unions, the real Trade Unions, will join as enthusiastically as the associations of non-manual workers; when some of us will have the courage to stand up and justify the faith that is in us, and create a public opinion which shall see that the only way we can get those things for which we all so devoutly pray, that higher standard of living and comfort for all, is through what is called the Capitalistic System.

* Address delivered before the Industrial League and Council at Caxton Hall, Westminster, on Wednesday, October 5, 1921.

British Association of Chemists

The New Unemployment Benefit Fund

A GENERAL meeting of the Manchester Section of the British Association of Chemists was held at the Midland Hotel, Manchester, on Thursday, October 13, for the purpose of considering the establishment of an Unemployment Benefit Fund upon the lines recommended in the Report of a Committee of the Association which had been appointed specially to consider the matter. Mr. E. F. Morris presided, and there was a very large attendance.

The main purpose of the scheme, briefly expressed, was "to maintain funds . . . for the relief of members when unemployed, sick, victimised, or in distress." In their report the Committee pointed out that the professional man, unlike the manual worker, had at present no fund to fall back upon when he was unemployed, while the high cost of living left him little opportunity to accumulate savings sufficient to meet such an emergency adequately. They recommended that the scheme should be obligatory. No scruples as to receiving charity could arise in a scheme which required every member of the Association to contribute a definite amount per annum to an Unemployment Fund on which a member felt he was entitled to draw when he found himself without employment. Such a scheme, moreover, would help to prevent an unemployed member from taking a post at a salary insufficient to enable him to maintain his professional status. It was hoped that the majority, at any rate, of the higher-salaried members would see their way to subscribing even more liberally to the Fund than their less fortunate colleagues.

Scale of Contributions and Benefits

The proposed by-laws of the Unemployment Fund, comprised in 17 clauses, provide that benefits should be paid on a "unit" system, and should vary in accordance with the number of units paid. A subscription for one unit of benefit is to be compulsory for every member. A subscription unit of one shilling per calendar month would secure for any member joining the Association below the age of 41 a payment of 20s. per week for any one period not exceeding 26 weeks of unemployment, or for a total period not exceeding 26 weeks in any 104 consecutive weeks. The maximum number of units for which a member might subscribe was dependent upon age, and in accordance with the following scale, except in the case of a married member who might take up one extra unit.

Age at joining.	Benefit per week per "unit" subscribed.	Maximum number of units for which a member may subscribe.
21—30	20/-	3
31—40	20/-	4
41—46	17/6	5
47—60	15/0	6

Members joining under the age of 41 continued to receive benefits at the unit rate of 20s. after reaching that age; any additional units, however, taken up after the age of 41 only entitled such members to benefit on the reduced scale applicable to that age in respect of such additional units.

Scheme Approved in Principle

The Chairman having placed the scheme before the meeting, Mr. F. Scholefield said that while impressed with the great desirability of the scheme he had doubts respecting its actuarial soundness. Taking a unit with a subscription of 1s. per month, or 12s. per annum, and assuming a paying membership of 1,200, the total amount received would be about £720 in any one year. Dividing the £720 by the benefit of £26 per annum there would be benefit for something like 30 members, assuming, of course, they were each unemployed for 26 weeks. The amount of unemployment among salaried chemists at the present time was very great, and would possibly increase in the near future.

This point of view was also taken by one or two other members, while others were of opinion that, given time, the scheme could be made actuarially sound.

It was pointed out by several of the speakers that the scheme had been drawn up in accordance with the advice of actuaries, who, having regard to the fact that there was no previous data upon which to proceed, had endeavoured to formulate it upon as sound a preliminary basis as possible.

After an exhaustive discussion it was resolved, with only one dissentient, that the section whole-heartedly support the scheme, several members expressing the opinion that this should be done even if only for the purpose of ascertaining its practicability and adaptability in regard to future requirements.

The Chairman stated that the whole matter could be raised again, if necessary, at the annual meeting of the Association to be held at Manchester on the 29th inst.

The following members took part in the discussion: Messrs. F. Scholefield, E. F. Morris, M. P. J. Davies, C. W. Carpenter, E. B. Anderson, R. Dearden, W. Kay, W. E. Kay, D. M. Paul, W. Stafford, E. N. Marchant, A. Gill, P. Delahunty, Swindells and Heald.

University of Birmingham

Opening of Chemical Society's New Session

THE University of Birmingham Chemical Society opened its new session on Monday, October 17, with the presentation for the first time of the Frankland Prize and an address by the Principal (Mr. C. Grant Robertson). The awards were as follows:—Frankland Medals and Prizes, F. M. Lea, B.Sc., and W. Ledbury, B.Sc.; President's Prize for the best paper read to the Society in the previous session, W. J. Hickinbotham, M.Sc., and H. G. Reeves, B.Sc.; the Society's discussion prize to W. A. P. Challinor, M.Sc., and H. S. Rooke, M.Sc.

The Principal, in his address entitled "Natural Science as an Instrument of a Liberal Education," showed that a liberal education was not confined to one sphere of the world's knowledge, but embraced a thorough grounding in every branch. A man's life was limited and the object of his education was not to increase the utilitarian value of his mind, but so to train the mind that he was capable of tackling any and every problem. An educated man was one who had learned how to learn. The central point was not the utilitarian or the professional, but the educational, particularly from the University standard and the University ideal. One point that had become increasingly clear in the last two years was the real unity of knowledge.

A vote of thanks to the Principal was proposed by Mr. F. R. Jones, seconded by Mr. W. J. Hickinbotham, cordially supported by the President (Professor G. T. Morgan), and carried with acclamation.

The following awards have been made to students of the Chemical Department during the past session:—1851 Royal Exhibition, H. Bengen, M.Sc.; Beit Fellowship, W. A. P. Challinor, M.Sc.; Salters' Fellowship of Industrial Chemistry, F. R. Jones, M.C., B.Sc.; Research Scholarship in the Chemistry of India Rubber, tenable at the Holloway Polytechnic, B. B. Evans, B.Sc., A.I.C.

In the thirty-first annual report it was stated that the 1920-21 session had been the most successful in the long history of the Society. Ten meetings had been held, the average attendance at which had been 104, which was a considerable increase on the previous session's average. In addition to social gatherings, a number of visits to works were arranged, namely:—Messrs. Ellington's Electroplate Works on Thursday, March 3; the Dunlop Rubber Company and the Rudge-Whitworth Company on Wednesday, March 9; and on Wednesday, May 4, a party motored to Stratford-on-Avon to visit Messrs. Flower's Brewery. The President's prize for the best student paper delivered before the Society had been awarded by the assessors jointly to Mr. W. J. Hickinbotham, for his paper on "Fermentation," and Mr. H. G. Reeves, for one on "The Structure of the Atom and its Bearing on Valency."

The Fermogas Co., which figured largely in the United States Press about a year ago as the owner of a process of fermentation for the production of ALCOHOL FROM CELLULOSE WASTE, has again come to the fore. According to *Drug and Chemical Markets*, Stanislaws C. Papp, otherwise known as Professor F. John Chassler, inventor of the process, is at present serving a sentence of from two and a half to five years in Sing Sing. The process was supposed to convert cellulose directly to alcohol without passing through the intermediate stage of sugar. Evidence was brought to show that the alcohol which ran the motor came from a barrel and not from the fermentation.

Petroleum Refining in Canada*

TEN petroleum refineries were operated in Canada in 1918. Three of these were located in Ontario; three in Alberta; and one in each of the provinces of Nova Scotia, Quebec, Saskatchewan and British Columbia.

The total capital employed in these 10 plants at the end of the year amounted to $35,745,410, of which $23,535,257 represented land, buildings, fixtures, machinery and tools. Cash, trading and operating accounts, and bills receivable amounted to $407,408, while materials on hand, stocks in process, finished products, fuel and miscellaneous supplies on hand were valued at $11,802,745.

Employees, Salaries, and Wages

The average number of wage-earners engaged in these refineries was 2,938. Wages paid allowed a *per capita* payment of $1,175, or a total sum of $3,451,642. The salaried employees numbered 272. The average payment to these was $1,366, the total sum having been $371,676, of which $91,459 went to officers, superintendents and managers.

The following table shows the distribution of the working staff on December 15, 1918. The works sub-total (3,060) in the table is somewhat larger than the average number of wage-earners (2,938) mentioned above, due to the fact that the number on the pay-roll increased to some extent in December, the month in which distribution was made.

TABLE I.—DISTRIBUTION OF NORMAL WORKING STAFF

1918	Male.	Female.
Salaried Employees—		
Officers, superintendents and managers	27	1
Clerks, stenographers, salesmen and other salaried employees	189	55
OFFICE SUB-TOTAL	216	56
Wage-Earners, receiving per week—		
Less than $10	3	11
$10, but less than $15	76	6
$15, but less than $20	848	—
$20, but less than $25	788	1
$25 and over	1,327	—
Works Sub-Total	3,042	18
Grand Total	3,258	74

Fuel

The total cost of fuel used in the refineries, exclusive of any supplied to employees, was $3,242,796. Of this sum the larger portion, or $1,721,642, was given as the value of oil and gasoline used, $1,425,850 for 247,423 tons of bituminous coal of various grades, and the balance, or $95,304, for petroleum, coke and natural gas.

The following table shows the source, kind, quantity and cost at the works of all the fuel used during the year:—

TABLE II.—FUEL USED.

Kind.	Unit of Measure.	Canadian. Quantity.	Canadian. Cost at Works.	Foreign. Quantity.	Foreign. Cost at Works.
Bituminous coal, slack	Short tons	16,725	$72,252	211,127	$1,222,474
,, ,, lump	,,	—	—	8,088	$56,616
,, ,, run of mine	,,	1,214	$9,402	10,269	$65,106
Gas (natural)	1,000 c. ft.	186,783	$22,241	—	—
Total			$103,895		$1,344,196

Kind.	Unit of Measure.	Quantity.	Assigned Value.
Petroleum Coke, produced chiefly from imported crude oil	Short tons	19,880	$73,063
Gasoline, produced chiefly from imported crude oil	Gallons	15,891	$4,092
Oil (fuel), produced from imported crude oil (chiefly)	,,	21,623,649	$1,717,550
Total			$1,794,705
Grand Total			$3,242,796

Materials Used

According to reports from the refineries, 262,641,149 galls. of crude oil was received at the works, of which 12,258,184 galls. was from Canadian wells and 250,382,965 galls. imported. The total cost of oil received at the works was $23,708,658, of which $22,789,762 was paid for the imported oil and $918,896 for the product of Canadian wells.

The consumption of oil reported showed 261,742,274 galls. of crude oil as having been used at the works. Of the total quantity 10,050,783 galls. were from Canadian wells and 251,691,491 galls. from the United States. The imported oil cost $21,890,862, and the product of Canadian wells $882,230.

The following table shows the kind, quantity and cost at the works of all the materials used during the year:

TABLE III.—MATERIALS USED.

Kind.	Unit of Measure.	Quantity.	Value.
Crude oil, product of Canadian wells	Gals.	10,050,783	$882,230
Crude oil, imported	,,	251,691,491	21,890,862
Sulphuric Acid	lbs.	38,224,856	408,482
Caustic Soda	,,	1,993,251	45,782
Litharge	,,	97,319	11,886
Sulphur	,,	52,302	2,234
Other materials (value only)	—	—	843,942
Cooperage stock (value only)	—	—	369,157
Total			$24,454,575

Products

The total production, according to reports to the Bureau of Statistics, had a selling value at the refineries of $37,866,907. Of this sum $19,247,402, or 50·8 per cent., was the value of 72,169,916 gallons of gasoline and motor oils; $7,130,301, or 18·8 per cent., was the value of 56,220,066 gallons of illuminating oils, and $6,629,980, or 17·5 per cent., of 84,784,278 gallons of fuel and gas oil and tar.

The following table shows the total production of the various commodities, with their selling values at the refineries:

TABLE IV.—PRODUCTS.

Kind.	Unit of Measure.	Quantity.	Selling Value at the works.
Gasoline and motor oils	Gals.	72,169,916	$19,247,402
Benzene, benzoline and other petroleum spirits	,,	1,530,867	384,901
Illuminating oils	,,	56,220,066	7,130,301
Lubricating oils	,,	14,401,703	2,571,367
Wax and candles	lbs.	13,490,528	1,136,311
Fuel and gas oil and tar	gals.	84,784,278	6,629,980
Grease	lbs.	7,435,605	525,274
All other products, including asphalt and petroleum coke	—	—	241,371
Total			$37,866,907

* From an advance chapter of "Chemicals and Allied Products in Canada in 1918," prepared under the direction of S. J. Cook, chief of the mining, metallurgical and chemical division of the Dominion Bureau of Statistics, Ottawa.

Miscellaneous Expenses

The miscellaneous expenditures chargeable against production and sales amounted to $2,129,825 during the year. Of this sum $859,197, or 43·4 per cent., was paid for repairs to buildings and machinery.

The total value of imports of petroleum and petroleum products in 1918 was $13,127,178, of which $13,359,636 was paid for 229,010,561 gallons of crude oil imported by oil refiners to be refined in their own factories.

Exports of crude coal oil or kerosene in 1918 were 270,302 gallons valued at $28,415, and of refined oil 1,946,967 gallons, valued at $206,675. There was also an export of naphtha or gasoline of 91,229 gallons valued at $28,778.

Institute of Chemistry

Formation of a Huddersfield Section

A MEETING of fellows and associates of the Institute of Chemistry was held on October 14 in the Technical College, Huddersfield. The chair was taken by Dr. H. H. Hodgson, who gave an account of the recent meeting at York of members residing in the north-eastern voting district. On that occasion it was felt that the district was too large for members to keep in effective touch with one another, and the formation of local sections was favoured. The Registrar outlined the present position of the institute, and expressed a hope that more local sections would be formed. He mentioned that the Institute had been approached by the Board of Education with a view to its co-operation with the teaching of chemistry in the technical schools of England and Wales.

In view of the large number of members of the Institute residing in or near Huddersfield it was felt that the interests of these members could best be served by the formation of a local section. A resolution was carried that the permission of the council be sought to form such a local section, and a committee was appointed and officers elected to carry out the necessary arrangements for this purpose, and to arrange for the next meeting.

A register of local members of the Institute is being compiled, and it is announced that those who did not receive notice of the above meeting may send their names and addresses to Mr. D. H. Peacock, British Dyestuffs Corporation, Ltd., Huddersfield.

Oil in British West Indies

THE Department of Overseas Trade has recently issued a report on economic and financial conditions in the West Indies, in which it is stated that oil production in Trinidad increases from year to year, although the exports during 1920 fell below the average in recent years, owing partly to greatly increased local consumption of gasoline and partly to the fact that more oil is now exported in a refined state. The report goes on to point out that a number of new companies have recently commenced operations, and that it may now be said that all the important oil interests are represented. During 1920 a local company was formed to contract for drilling and erecting oil rigs, and thus to economise in the vast amount of material required in these operations. A British company has commenced drilling in various parts of Barbados, and in view of the possibility of the existence of oil, legisation has been introduced in British Guiana, British Honduras, and Jamaica to regulate the search for and winning of petroleum.

An Appreciation from Croatia

THE letter which we reproduce below has a double interest. In addition to showing that THE CHEMICAL AGE is read with interest over a very wide area, it also furnishes an object-lesson to people who correspond in a foreign language with a proper knowledge of grammar and construction :—

THE CHEMICAL AGE, LONDON.

The signed chamber thanks very best for the sended publication, which was read with interest, she only remarks, that our town Zagreb is not situated in Serbia but is the capital of Croatia, forming part of the new state of the SHS, and beggs addressing to the same to employ the name Croatia.

From the Chamber of Commerce and Industry,
Zagreb, Croatia.

Society of Chemical Industry

Glasgow Section

THE inaugural meeting of the Glasgow Section of the Society of Chemical Industry was held on Monday in the Institute of Engineers and Shipbuilders, Mr. J. H. Young, chairman of the Section, presiding. Professor G. G. Henderson, in the course of an address on the new epoch in chemical science, which, he said, had now arrived, said that although a few years ago some chemists had denied the atomic theory, the atom was now an experimental fact and atoms could actually be counted.

Atomic nuclei were built up of hydrogen or hydrogen and helium atoms. The helium atom also seemed to consist of four hydrogen atoms. Thus the dream of the alchemists had been realised; for the nitrogen atom had been broken up by bombardment with alpha particles, and it was believed that neon and helium had been produced by the action of electric discharge on rarefied hydrogen. In conclusion, Professor Henderson referred to recent developments in physical chemistry and cited the progress which had been made in the study of colloids, catalysis, and the fixation of atmospheric nitrogen as proof of the arrival of a new epoch in chemistry.

Dr. J. P. Longstaff, secretary of the Society, gave an address in which he referred briefly to the recent meeting of the Society in Canada. He felt sure that the Glasgow Section would do all in its power to make the next annual meeting a complete success.

Chemical Smoke Screens

DURING the hearing by the Royal Commission on Awards to Inventors of three claims respecting the invention of smoke producing apparatus, Mr. R. Moritz, who appeared for the Crown, stated that there were three methods used in the attack on Zeebrugge. The first method was a smoke float apparatus, usually thrown overboard from a ship, and known as the "F" type; the second was an apparatus used on board ship for the purpose of making a smoke cloud, known as the "G" type; while the third was called funnel smoke. The smoke-floats contained various chemical mixtures, which emitted large quantities of smoke when alight. In the "G" type there were two containers, the one holding ammonia and the other a volatile chloride, which were caused to commingle under pressure, the result being a dense cloud. By the funnel smoke method, acid was injected into the exhaust pipes of motor-boats or into the funnels of ships, with the result that dense white clouds of hydrochloric acid and sulphuric acid were created. It was discovered that the Germans were using this chemical in land warfare. A docket to this effect came before Commander Brock, who consulted a member of his staff, Dr. Price, as to what use should be made of the information. The method was tried in the exhaust pipes of a motor lorry, and was found to be a great success. It was used on all the ships taking part in the attack on Zeebrugge, and was also used in tanks for land warfare. Commander Brock, however, remarked counsel, appeared to have nothing to do with the invention. He was chief officer of the research department of the Chemical Warfare Section of the Navy, and had a number of trained chemists under him, and in each case made no single inventive step himself.

It was stated for Commander Brock's representatives that an award was contemplated in his case by the Admiralty Awards Council, but that payment was deferred in order that the claim might come before the Commission. The Commission reserved their decision.

Benn Brothers' Social Circle

THE first meeting of the winter session of Benn Brothers' Social Circle was held on Friday, October 14, at the Eustace Miles Restaurant, Chandos Street, and took the form of a whist drive. The board of directors were represented by Mr. F. H. Elliott, and the prizes at the close were distributed by Mrs. Elliott to the following :—Miss East, Miss Roe, Miss Robinson, Mr. Elliott, Miss Pountney and Mr. Duffy. A pleasant evening concluded with music and dancing.

The Debating Section has made a successful start and on Monday evening there was a spirited discussion on the Irish question. Arrangements are in progress for the formation of a Dramatic and Musical Section.

Export of British Barytes

The United States as a Potential Market

THE British Vice-Consul at Philadelphia (Mr. T. H. Fox) reports that there is a good demand in the United States for ground barytes, especially of the finer grades. The opinion is expressed that a considerable supply of barytes could advantageously be exported to the American market, particularly for sale along the Atlantic seaboard. It is highly important, the report states, that any shipments made should be of perfectly white and finely ground barytes as the demand is only for the highest grade. Dealers report that British barytes has not been offered for sale in the United States for some time, but there have been a number of importations from the Continent recently which, however, were not sufficiently white to please consumers and did not bring the highest market prices. At the present time the demand is for a guaranteed white, fine, ground, floated barytes in double bags or barrels, the value of which is now $22 per ton f.o.b. cars or ex-dock New York or Philadelphia. A good quality of floated barytes produced in the Western States is of the required whiteness and is being sold at the price named above in car-load lots of from 25 to 30 tons. Small quantities are being retailed at somewhat higher prices, but car-load figures would rule in the case of the imported material.

In conclusion, Mr. Fox states that a number of firms in America are at present reluctant to express interest in the importation of barytes owing to the revision in the customs tariff. The present duty on crude barytes is 15 per cent. *ad valorem* and on manufactured barytes earth 20 per cent. *ad valorem*, whereas the proposed tariff would place a duty on crude or unmanufactured barytes, including barytes earth, of $4 per ton and on barytes, ground or otherwise manufactured, of $7.50 per ton, which, in the opinion of importers, would be almost prohibitive. He adds, however, that according to the latest report from Washington the Tariff Act may not be passed until next March, and may be subject to considerable amendment of the present proposals, so that British exporters might therefore be interested in investigating this market with a view to doing business there. In this connexion the Comptroller General, Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, W.S. 1, will be pleased to supply the names of likely importers and users of British barytes in the United States.

Water-absorbing Properties of Varnishes and Paints

DR. R. S. MORRELL, President of the Oil and Colour Chemists' Association, devoted his Presidential Address on October 3 to giving an account of some recent work he had done in studying the water absorption of varnish and paint films.

He dealt with the water absorption of curves in solutions of sodium chloride, calcium chloride and of sodium sulphate solutions of various strengths, and gave the results of a series of experiments performed with elastic varnishes containing lead and special water-resisting varnishes, using the distilled water and sea water media. After describing these experiments at some length the author found, *inter alia*, that if the nature and concentration of the oil, resin and thinners was constant the water absorption was determined by the acidity or basicity or by the plus ion concentration in the varnish, and the opacity was proportional to the plus ionic concentration. Thus the addition of lead and lime oxides tended to increase water absorption, whereas reduction in acidity of the gum inhibited the water absorption, so that gum esters tended towards reduction in the water absorption.

Dealing with the water absorption of paints, Dr. Morrell said that the absorption was partly due to the nature of the medium, and partly to the size of the pigment particles, provided that the pigment was inert.

The lecturer then gave methods of determining the surface tension of a drying oil or a varnish. Differences obtained when using Morgan's drop and the Worthington coil were explained, and attention was called to the variation in the acidity of a varnish film on exposure to air.

Dr. Morrell then dealt with the surface tensions of metallic oil driers and elasticity and water absorption.

An interesting discussion followed, in which Dr. J. L. Goldsmith, Dr. T. M. Lowry, and Messrs. H. H. Morgan, Berry and A. E. de Walle took part.

New Nitrate Prices

Agreement Reached between Producers and Pool

MESSRS. AIKMAN (LONDON), LTD., state in their nitrate report that an agreement has been reached between the Associacion de Productores de Salitre de Chile and the London Nitrate Pool on the following terms :—

In consideration of the Pool releasing the Association from their undertaking not to sell below 14s. per quintal f.o.b. Chile, the Association will pay the Pool and other buyers a minimum indemnity of £1,500,000, which will be collected and paid by a contribution of 1s. 8d. per quintal on all fresh sale nitrate shipped between October 1, 1921, and March 31, 1922; 1s. per quintal on nitrate shipped between April, 1922, and June, 1922; 4d. per quintal on nitrate shipped between July, 1922, and June, 1923.

All fresh sale nitrate shipped in these periods is subject to the indemnity, but, should the total collected by June 30, 1923, not have reached the sum of £1,500,000, then the indemnity shall continue until this sum has been collected. The division of the indemnity between the various buyers will be determined by the President of Chile, who is to be the arbitrator on all questions.

The Association will fix the following price scale to operate from now up to June 30, 1922 : October, 10s. 6d. per quintal; November/April, 1922, inclusive, 11s. per quintal; May, 1922, 10s. 9d. per quintal; June, 1922, 10s. 3d. per quintal. After June, 1922, the Association will have liberty to fix selling prices as they may think fit. The agreement will be in the form of an "Escritura Publica," countersigned by the Chilean Finance Minister.

Messrs. Henry Bath & Son, in a circular on the agreement say :—

Except to those immediately concerned, any discussion of the merits of this settlement is superfluous. The outstanding feature is that both the producers and the pool have made sacrifices in order that the position of the nitrate industry in Chile may be improved as quickly as possible, and it is realised that the surest way to do this is to increase consumption by offering the article at a moderate price, and, above all, by restoring confidence.

Now that the association has fixed 11s. per quintal for season shipment, consumers will have faith in the maintenance at least of the new and much-reduced scale of European prices lately introduced by the pool, which is materially below the f.a.s. parity, and as an earnest of this it may be mentioned that the pool has sold about 100,000 tons since the reduction first came into force on the 3rd inst.

New Chemistry Professor at St. Andrew's

AT the opening of the winter session at St. Andrew's University on October 5, Principal Irvine inducted Dr. Robert Robinson, the newly appointed Professor of Chemistry, and Dr. William John Tulloch, the newly appointed Professor of Bacteriology, to their respective chairs. In welcoming the new professors, Principal Irvine remarked that there was something peculiarly appropriate in the fact that on the same day a chemist and a bacteriologist should be inducted to their chairs, for bacteriology was as much the offspring of chemistry as of biology. More than any other science the subject was a product of the instinctive genius of one man, and Louis Pasteur, the father of bacteriology, was in the first place an organic chemist.

German Reparation Recovery (No. 12) Order

UPON the recommendation of a Committee constituted under Section 5 of the German Reparation (Recovery) Act, 1921, the Board of Trade has issued a further Order known as the German Reparation Recovery (No. 12) Order, 1921. The Order states that any article in regard to which it is proved to the satisfaction of the Commissioners of Customs and Excise that after being consigned to Germany by a person or persons not resident in Germany, it is thence consigned to the United Kingdom, shall be exempt from the provisions of the Act, provided that the Commissioners are satisfied that it has not undergoone any process of manufacture in Germany and has not whilst in Germany passed out of the ownership of the person or persons by whom it was consigned thereto.

Power Alcohol

Recent Investigations in Ceylon

WRITING from Kalutara a correspondent of the *Times* states that some remarkable successes in the distilling of power alcohol from waste vegetable matter; rice, straw, &c., were reported from Rangoon recently. At the moment, he states, the Philippine Islands produce nearly three million gallons of power alcohol a year from the nepa plant. Java, which supplies a great deal of Ceylon's sugar requirements, and Hawaii are reported to be making arrangements to produce power alcohol on a very big scale.

The Ceylon and Malayan sugar industries, killed by rubber, can be revived on a profitable basis. The sugar industries of British Guiana, South Africa, Australia, India and Mauritius can be extended. From these a large output of power alcohol could be obtained; Mauritius alone is capable of producing 2,500,000 gallons of power alcohol a year, but at present its molasses run to waste.

The introduction by the Ceylon Government, as an experiment, of the contract supply system of selling arrack in the Northern and Uva provinces has produced a remarkable increase in revenue over the former procedure. The Government have decided to extend the system to other provinces and to establish more distilleries to manufacture the increased quantities of arrack that will be needed.

Key Industries List

Joint Conference of Chemical Merchants

AT the London Chamber of Commerce on Thursday a joint preliminary conference of organisations representing chemical interests was held to discuss the effects of the Safeguarding of Industries Act on the position of merchants and to consider the possibility of joint action. The following bodies were represented: Chemical and Dyestuff Traders' Association; British Chemical Trade Association; Chemical Trade Section (Merchants' Sub-Section London Chamber of Commerce); Chemical and Allied Trades Section, Manchester Chamber of Commerce; Colour Users' Association; Fancy Goods Section, London Chamber of Commerce; Perfumery Manufacturers' Section, London Chamber of Commerce; Mr. James D. Kiley, M.P., representing the Joint Vigilance Committee of the Fancy Goods Section and China and Glassware Section, London Chamber of Commerce.

A general discussion took place mainly on the composition of the list of articles affected by the Act, and a resolution was adopted expressing dissatisfaction with it and suggesting co-operative action on the part of all interests affected to secure its revision. It was decided to invite manufacturers, users and merchants to a further conference on Thursday next to decide on the policy to be followed.

New Uses for Rubber

Rubber Growers' Association Competition

IN July, 1920, the Rubber Growers' Association offered various awards for ideas and suggestions for extending the present uses and for encouraging new uses of rubber, and the report and award of the judges has now been published. The results appear to be disappointing, as, out of the suggestions of nearly 2,000 competitors, it has been impossible to find any suggestions which, in the opinion of the judges, merited a substantial award, and had it been in their power to do so, the adjudicators would have withheld the principal prizes. They mention that Goodyear in his work on "Gum Elastic," published in 1855, gives an exhaustive list of possible uses for rubber, and apart from uses arising from modern developments, there is hardly an idea suggested in the competition which is not anticipated by him.

After careful consideration the judges came to the conclusion that the use of sponge rubber for upholstering purposes was the suggestion with the most merit about it, although, as it is referred to by Goodyear in his work of 1855, it can scarcely be considered novel. There have recently been very considerable technical developments in the manufacture of rubber in the sponge form, and in the judges' opinion there is a very great field for the utilisation of this material for the upholstering of furniture, public service vehicles, and other purposes of general utility.

Chemical Matters in Parliament

German Reparation Receipts

IN reply to Lieut.-Commander Kenworthy, Mr. Hilton Young (House of Commons, October 18) said that the sums received by this country up to September 30 under the Financial and Reparation Clauses of the Treaty of Versailles (including cash received from the Reparation Commission, the proceeds of the German Reparation (Recovery) Act and the proceeds of the sale of ships and dyestuffs) amounted to £5,444,000 in repayment of the advances under the Spa Coal Deliveries Agreement, and £38,704,000 on account of this country's claim for cost of occupation.

Safeguarding of Industries Act

Mr. Kiley (House of Commons, October 18) asked whether, under the Key Industries section of the Safeguarding of Industries Act, synthetic camphor, an article not produced in Great Britain, had been included in the list of fine chemicals on which a duty of 33⅓ per cent. was imposed; whether this was the raw material of celluloid, which was extensively manufactured in this country, and whether it was proposed to suspend that section of the Act in so far as it affected commodities not manufactured in this country.

Mr. Baldwin said that he understood that the classification of synthetic camphor as a synthetic organic chemical was not disputed. The Board of Trade had no discretion to exclude from the operation of the Act any article covered by the Schedule, and he was not prepared to introduce a postponing measure. He did not think Mr. Kiley had been correctly informed with regard to his suggestion, in a supplementary question, that the Board of Trade had power to publish a list of commodities, and that it was open to them to include or exclude any commodity as they thought fit.

Corrections in Key Industries List

THE following errata and corrigenda in the "Lists of Articles chargeable with duty under Part I. of the Safeguarding of Industries Act" (as issued by the Board of Trade in September, 1921) are notified for general information. The lists are now being reprinted by the Stationery Office and these corrections will be embodied in the reprint:—

Page	5.	For "cyclophotometers" read "cyclophorometers."
,,	8.	For "measures, cylindrical," read "measures, cylindrical, conical," &c.
,,	15.	For "carium" read "cerium."
,,	16.	Line 8. For ". . . added to names of chemicals" read "added to names of organic chemicals . . ."
,,	32.	Delete "calcium phosphate."
,,	32.	For "R. calcium phosphate" read "R. calcium phosphates."
,,	32.	Insert prefix R before calcium tartrate.
,,	35.	Insert prefix R before copper iodide.
,,	43.	Insert prefix R before haematein.
,,	45.	Insert prefix R before iron bromide.
,,	52.	Delete comma between "methylene" and "blue."
,,	56.	For "phenetidine, amidacetyl hydrochlorate" read "phenetidine amidoacetyl hydrochlorate."
,,	59.	Insert prefix R before potassium chlorate.

Affairs of a Paint Manufacturer

THE meeting of creditors under the receiving order made against Robert D. Stewart, paint, colour and varnish manufacturer, Archway Road, Highgate, N., which had been adjourned to enable the creditors to appoint a trustee (*see* THE CHEMICAL AGE, October 15, p. 457), was held last week at the London Bankruptcy Court. The proceedings were on the petition of the Produce Brokers Co., Ltd. The creditors passed resolutions for bankruptcy and agreed to the appointment of Mr. E. H. Hawkins, incorporated accountant, of 4, Charterhouse Square, E.C., as trustee of the estate, the bond to be given by him as security being fixed at £3,500.

From Week to Week

Mr. J. W. WILSON, M.P., has been appointed a director of Bryant & May, Ltd.

Dr. E. H. COOK, of Bristol, the public analyst for Bath, is to be Lord Mayor of Bristol for the ensuing year.

The Distillers' Co., Ltd., of Edinburgh, have appointed Mr. W. F. GARDEN as their general manager for Australia.

The Dalton Chemical Scholarship in the University of Manchester has been awarded to L. R. Ridgway, B.Sc.

Mr. H. M. NELSON has been elected Prime Warden, and Mr. J. A. Brewin Renter Warden, of the Dyers' Company.

Mr. C. D. HINSHELWOOD, of Balliol College, has been elected to an official Fellowship as lecturer in the Balliol and Trinity Colleges Chemical Laboratory.

Mr. MOORE SYKES, manager in Australia of the British Dyestuffs Corporation, Ltd., recently returned to Australia after a business trip to the United Kingdom.

Mr. P. H. GRIFFITHS, B.Sc., of Ammanford, a student at the University College, Cardiff, has been appointed a lecturer in chemistry at the Cardiff Technical College.

DR. J. T. BARKER, of Widnes, has returned to England after a visit to the United States, during which he carried out special work for the North American Chemical Co., of Bay City, Michigan.

It was reported at Cardiff on October 15 that the Midi Railway of France had placed contracts with local firms for 50,000 TONS OF PATENT FUEL, at 26s., f.o.b., for delivery over next year.

The Chief Inspector of Factories gives notice that MR. F. J. PARKES is the Inspector of Factories in charge of the Central London district. Mr. Parkes' official address is 31, Shoreditch High Street, E.1.

At the age of 78 years, the death is announced of Mrs. SCHINTZ, widow of Mr. Gaspard Schintz, who died in 1913 and was known as the "nitrate king," leaving a fortune of over a million sterling.

At a meeting on Wednesday of the Grand Council of the Federation of British Industries, Mr. LENNOX B. LEE, chairman of the Calico Printers' Association, was recommended for election as a vice-president of the Federation.

During the past week THREE CARGOES OF CRUDE PETROLEUM, totalling 4,455,970 gallons, arrived at Swansea from Abadan, Persian Gulf. In the previous week only one cargo arrived, amounting to about 2½ million gallons.

Mr. G. H. Hardacre, a Birmingham engineer, claims to have discovered a NON-FREEZING LIQUID suitable for use in motor radiators, aeroplanes and engine cylinders. The mixture, which, it is said, evaporates very slowly, is also claimed to be non-corrosive.

The death has taken place at his residence, 18, Heaton Grove, Bradford, of MR. SMITH DUFTON, a member of the firm of Clay & Dufton, chemical and colour merchants, Forster Square. He was 74 years of age, and was one of the oldest traders in the city.

The officials and workmen at the Elswick Lead Works, Newcastle (Walker, Parker & Co., Ltd.), have presented Mr. JOHN FAIRLAM, works manager for 29 years and the first official to complete his jubilee in the service of the firm, with a gold watch and a silver tea service.

During his visit to the United States in connexion with the joint meeting of the Society of Chemical Industry with the American Chemical Society, PROFESSOR J. W. MCBAIN addressed members of the Delaware Section of the American Chemical Society on the "Characteristics of Sols, Gels and Curds."

It is estimated that the destruction of the OPPAU CHEMICAL WORKS will involve a reduction of about one-sixth (20,000 to 24,000 tons) of the total monthly output of nitrogen products in Germany. The reconstruction of the works has been already begun, and is expected to be completed early next year.

Information from Berlin reports a marked improvement in the GERMAN POTASH INDUSTRY. After a long boycott from America due to the high German prices, a contract has been concluded with seven American firms for delivery of 75,000 tons at an average price of $30 a ton. The whole contract totals about 300,000,000 marks.

Last week MCGILL UNIVERSITY, Montreal, where the Annual Meeting of the Society of Chemical Industry was held this year, celebrated the centenary of its foundation. During the proceedings Lord Byng of Vimy unveiled a memorial tablet to the 341 McGill men killed during the war, and in honour of the 2,500 who served.

A public meeting, open to all interested in the rubber planting industry, will be held under the auspices of the RUBBER SHAREHOLDERS ASSOCIATION, LTD., at the Great Hall, Cannon Street Hotel, E.C., on October 26, at noon, when the policy and programme of the association will be fully explained and questions and discussion will be invited.

Mr. A. O. PONDER, Rhodes Scholar, of Balliol College, Oxford, has been appointed to a Lectureship in Chemistry in the college. Mr. Ponder, who served with the New Zealand Expeditionary Force from 1915 to 1918 and was awarded the M.C. in July, 1921, obtained distinction in the shortened course for the Oxford Final Honour School of Natural Science (chemistry).

PROFESSOR J. C. PHILIP, professor of Physical Chemistry at the Imperial College, South Kensington, was entertained at dinner on October 11 by his colleagues and students as an appreciation of his services in furthering the interests of the Royal College of Science during the past 21 years. An illuminated address and other gifts were presented to him by Sir William Tilden.

H. M. Ambassador at Washington reports that it is understood that the Chairman of the Tariff Committee of the House of Representatives has given assurances of the early submission to the House of a BILL TO EXTEND THE OPERATION OF THE EMERGENCY TARIFF, pending the enforcement of the revised Tariff now under consideration, and to continue the dye import control.

The death occurred on Monday at a London nursing home of MR. EDWARD JOHN BEVAN, F.I.C., of Abington, Watford. Mr. Bevan, who was in his sixty-fifth year, was County Analyst for Middlesex, a past president of the Society of Public Analysts and an original member of the Society of Chemical Industry. The interment took place at Watford Cemetery yesterday (Friday) afternoon.

At the next meeting of the SOCIETY OF PUBLIC ANALYSTS, to be held on Wednesday, November 2, at the Chemical Society's rooms, papers will be read by Dr. C. Butler Savory, on "An Improved Specific Gravity Apparatus" by Dr. J. C. Drummond and Dr. A. F. Watson on "The Testing of Food-Stuffs for Vitamins"; and by Mr. A. Lucas on "The Inks of Ancient and Modern Egypt."

Owing to the shortage of soluble phosphatic manures, it is probable that all grades of potash fertilisers will be more extensively used in the United Kingdom this season. The output of SULPHATE OF POTASH at the Alsatian mines is now said to be more than sufficient for the demand. Four factories have been in operation, and compared with last year, the production has been almost doubled.

At a meeting of the Senate of London University on Wednesday, Dr. W. B. TUCK was appointed to the University Chair of Chemistry, tenable at Middlesex Hospital Medical School; Dr. PAUL HAAS, to the University Readership in Plant Chemistry, tenable at University College; and Mr. W. E. CURTIS, B.Sc., as from January 1, 1922, to the University Readership in Physics, tenable at King's College.

MR. L. A. MITCHELL, Cathedral House, Long Millgate, Manchester, announces that he is now acting as sole licensee in Great Britain for Messrs. Perry & Webster, Inc., industrial chemists and engineers, New York, for granting licences to varnish makers to manufacture by the Perry & Webster system. This system deals with the complete recovery and utilisation of varnish fumes and elimination of odour and fire risk.

The *Norges Handelstidende* reports that a RESUMPTION OF WORK in the electro-chemical industry, which has been idle for a long time, is to be attempted. Mediation regarding new wages tariffs will commence, and in case of a solution being reached all the carbide factories, aluminium works and large factories in Odda are expected to resume work. The last-named are seeking a working loan from England.

Mr. George Heywood, presiding at the annual meeting of shareholders of the United Indigo & Chemical Co., Ltd., held in Manchester on Wednesday, was asked if LARGE IMPORTA-

TIONS OF GERMAN DYES would prejudice the company's business. Mr. Heywood said that although the recent enactment of the Government might have some slight prejudicial effect, speaking generally the company would benefit rather than lose, as a result of the low price of chemicals.

There was an increase in the volume of PATENT FUEL EXPORTS from South Wales last week, the total being 30,325 tons, as compared with 29,542 tons the previous week. The largest consignment was one of 5,200 tons from Swansea to Alexandria, but Cardiff sent 5,188 tons to Arzew and Swansea, 7,535 in two cargoes to Bordeaux. Other large shipments were 2,934 tons to Karachi and 2,104 tons to Pernambuco, both from Cardiff.

Important developments are in progress or are pending to cope with the boom which is anticipated in the OIL TRADE at Swansea. Six new tanks for the Anglo-Persian Oil Co., each with a capacity of one million gallons, are in course of construction. Two of these are at the east side of Queen's Dock, two on the dock side and two near the King's Dock jetty, where liners and other vessels of extra large draught will be able to load or discharge oil at any state of the tide without having to enter either dock.

The OPENING MEETING of the session of the Bristol and South Wales section of the Society of Chemical Industry was held at Swansea on Friday, October 14, Professor Coates presiding. A paper on "The Production and Refining of Petroleum" was read by Mr. E. Lawson Lomax, of the National Oil Refineries at Skewen, who described the many processes through which crude petroleum passes in being separated into petrol, kerosene, lubricating oils, vaseline and candles, and illustrated his remarks by lantern slides of the plant in use at the National Refineries. A discussion took place on the potentialities of this industry in South Wales.

A new offer for the United States Government nitrate plant at Muscle Shoals, Alabama, is reported to have been made by Mr. C. E. James, of Chattansoga, Tenn. He has made a cash offer of $5,000,000, and a proposition to lease the horse-power furnished by the Wilson Dam and Dam No. 3 at the rate of $1 per annum average horse-power for the first year. From the first year until the ninth year the rental would increase 50 cents per year per horse-power, bringing the maximum yearly rental to $6.50 per year average horse-power. The latter sum would be paid thereafter for the remaining period of the lease, which would continue for ninety-seven years.

In a paper recently presented to the American Electro-Chemical Society, Mr. B. G. Worth described an UNUSUAL CORROSION of a steam boiler. All attempts to control the action by electrolytic means failed. It was found that a notable quantity of ferrous carbonate was held in solution by excess of carbonic acid, which is a somewhat frequent condition in ground waters. Corrosion of metals by natural waters has been a subject of extensive study, and among other conditions a water containing much dissolved air, with little scale-forming material will often produce notable corrosion, especially if the feed water is introduced by a tube terminating at the boiler wall. The corrosion is generally less if the tube is prolonged to, or near, the centre of the water-mass.

Eleven separate courses of lectures on the HISTORY OF SCIENCE will be delivered at University College, London, during the session 1921-22. There will be a course on "The General History and Development of Science," by Dr. A. Wolf, and one on "The Beginnings of Science," by Professor Elliot Smith. In addition, there will be courses on the history of particular departments of science, including Physics: Sir William Bragg and Mr. Orson Wood; Chemistry: Professor Donnan; The Alchemical Period, Professor Collie; From Mayow and Boyle to Dalton and Avogadro, and the Development of the Molecular Theory, Dr. Irvine Masson; The Development of Organic Chemistry in the Nineteenth Century, Dr. O. L. Brady; and The Development of Physical Chemistry in the Nineteenth Century, Mr. W. E. Garner.

The inaugural meeting of the INSTITUTION OF RUBBER INDUSTRY was held at the Royal Society of Arts, John Street, Adelphi, on Wednesday evening, Mr. J. H. C. Brooking, M.I.E.Eng., the President of the Institution, in the chair. In his presidential address Mr. Brooking deplored the period of depression through which the industry was passing, but prophesied that when stable conditions of trade were restored we should emerge into a veritable "rubber age." Sir Henry Wickham, who made possible the inauguration of a plantation rubber industry, answered questions regarding the treatment of rubber, and Mr. Herbert Rogers, F.I.C., general manager of Jas. Lyne Hancocks, Ltd., read a paper on "Rubber Manufacture," in the course of which a number of lantern slides, lent by Dr. P. Schidrowitz, were shown.

Chemists who have had occasion to report the results of assays of oil shale will probably be interested in the ALIGNMENT CHART which has just been published by the U.S. Bureau of Mines. This Chart, prepared by M. J. Gavin, L. C. Karrick, and J. J. Jakowsky, gives in simple form the relations between the weight and volume of shale and shale oil. By the use of the chart it is possible to determine the yield of oil in gallons per ton of shale when the actual laboratory results are in terms of grams, ounces, or cubic centimeters. The whole operation consists of connecting two points on the chart by means of a straight line and reading the desired result without further calculation. Copies of the Alignment Chart for Determining Oil Yields in Assaying Oil Shale may be obtained free on application to the Director, Bureau of Mines, Washington, D.C.

In a letter which Mr. H. H. DAVIS, the chairman of the Vigilance Committee of the fancy goods section of the London Chamber of Commerce, has addressed to members of the House of Commons, it is stated that over 2,000 of the articles declared by the Board of Trade to have now become dutiable under the Safeguarding of Industries Act are actually not manufactured in this country at all. Many of them are important raw materials. An important example is that of synthetic camphor. "Synthetic camphor," it is stated, is a basic ingredient in the manufacture of celluloid. Celluloid manufacture in this country gives employment to a large number of workers, and, in addition, celluloid itself is the raw material of other trades, such as the cutlery trade and many branches of the fancy goods trade. Meanwhile, competitive articles made wholly or partly of celluloid are allowed to come in from abroad without duty. The effect of the Act in this case, therefore, is directly to penalise important British industries."

The Newport County Magistrates were occupied for a considerable time on Saturday, October 15, in hearing evidence in connexion with a case decided by them in October, 1920, when the Newport Co-operative Society was convicted and fined £10 for selling BAKING POWDER not of the SUBSTANCE and QUALITY DEMANDED, but which contained 7·5 per cent. excess of sulphate of lime. At a previous hearing the Co-operative Society set up the defence that the baking powder was warranted by the Co-operative Sundries Manufacturing Society, from whom they purchased it, and appealed to the High Court on this point. The High Court now remitted the case to the Newport Court to find out whether the warranty was written or verbal, what were the terms of the warranty, and whether the invoice was sent under pursuance of the contract, and, if so, when. The magistrates found that the contract was verbal, that the goods were warranted as pure and genuine and in conformity with the Act, that the invoice contained the usual warranty, and that the invoice was sent on June 5, 1919. These findings will be reported to the High Court.

In an address on the PETROLEUM PROBLEM before the London Chamber of Commerce on Monday Mr. A. Beeby Thompson said that the oil position of the Empire was less precarious than was usually thought. We had sat on our oil resources while America bestowed her richest mineral treasures lavishly. We had scoured the world for new sources of supply, while America had rested content with her home resources. America had skimmed the cream of her oil wealth at a period when prices were low, while we entered the world's market with our flush production when the value of oil had appreciated and our prices were high. America had yielded up to 1920 about 5,500,000,000 barrels of oil, or over 62 per cent. of the world's output, whereas the British Empire had only produced about 162,000,000 barrels of oil, or 2 per cent. of the world's total sum. But America had developed about 4,500 square miles of oil territory, whilst the output of British territory had been derived from about 70 square miles. British capital controlled supplies of oil so well distributed geographically that much of the danger of total isolation in the event of war was removed.

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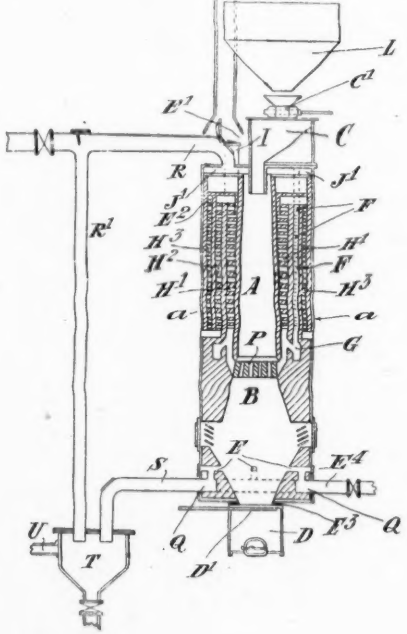
Abstracts of Complete Specifications

168,927. CONCENTRATION OF ORES BY FLOTATION. E. Edser, 3, Hillyfields Crescent, Brockley, London, S.E.4, and L. A. Wood, 62, London Wall, London, E.C.2. Application date, March 20, 1920.

The process is more particularly for the treatment of Cornish ores, containing cassiterite and wolfram. When these ores also contain metallic oxides such as those of iron and aluminium in an amorphous form, these become very finely divided on grinding the ore and produce a colloidal suspension when mixed with water. When the mixture is subjected to froth flotation it is found that an excessive amount of the frothing agent is required and the colloidal particles tend to float and may become associated with other particles, thus producing a low grade concentrate. In this invention a mixture of finely pulverised ore and water is treated with a deflocculating agent such as sodium silicate, which causes a separation of the ore particles while the colloidal particles remain suspended. Other deflocculating agents may be used, such as caustic soda, sodium carbonate, trisodium phosphate, a mixture of bisodium phosphate and caustic soda, sodium oxalate, sodium acetate, or silicic acid. The substance must be one which does not produce a gelatinous precipitate when used, *e.g.*, sodium silicate would not be used if the ore contained zinc sulphate. When the suspended matter is removed the residue is treated by flotation, using oleic acid as the frothing agent.

168,951. GAS GENERATOR. S. Moore, The Gas Works, Scunthorpe, Lincs. Application date, May 11, 1920.

The apparatus is a combination of a coal distilling retort with a water-gas generator. Coal is supplied from the hopper *C* to the vertical retort *A*, and the residue then passes into the producer *B* for partial or complete conversion into water gas. Primary air is blown into the producer through openings *E* and passes upwards through the passages *P*, while secondary air



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enters at *F* and meets the producer gas at the base of the regenerators *H'*. The gas burns in contact with the retort walls and distils the coal, while the products of combusion pass in series through the regenerators H^2, H^3 to the outlet valve *I*. Steam for the run period is admitted through the passages E^3, E^1 and air pipe *E*, and the gases pass upwards through the retort *A*, mixing with the coal gas and thence to the exit pipe *R*. The direction of the flow of gas may also be reversed by admitting steam at the points E^1, E^2, so that it passes downwards through the retort and through the regenerators respectively to the generator *B*.

169,003. PLASTIC COMPOSITIONS, PRODUCTION OF. Usher-Walker, Ltd., 33, Bouverie-street, London, E.C.4, and C. E. Soane, 31, Mattison Road, Harringay, London, N.4. Application date, June 14, 1920.

An infusible plastic composition is produced by treating a mixture containing gelatine and water with a pentose which produces furfuraldehyde *in situ* in the composition. A mixture of pentoses may be used such as arabinose and xylose. The pentose may be prepared by hydrolysis of the corresponding pentosan with dilute sulphuric or oxalic acid, neutralising with lime, filtering, and evaporating the acid-free filtrate under reduced pressure. The mixture is heated in a steam jacketed vessel and then run into moulds and further heated until it is rendered infusible. Examples are given of the treatment of a mixture of glycerine and liquefied glue and various filling materials such as wood pulp, magnesia, magnesium carbonate, or precipitated chalk, with arabinose syrup. The hardening of the composition is much more gradual in this process than when formaldehyde or its equivalents are used.

169,034. HEATING FURNACES, GAS FIRED. F. T. Rennison, 99, Psalter Lane, Sheffield. Application date, June 30, 1920.

A heating furnace is provided with a floor below which rectangular bricks *c* are arranged, each having longitudinal flanges c^1 and a central passage *e*, so that when interposed between the floor and the top of the waste gas flues *n* a series of flues *d*, *e*, *f* are formed. Gas burners *j*, *j* are supplied from gas mains *g*, *g* and project into the flues *d* on opposite sides. The combustion products pass through the flues *e*, *f*, *n* and *t* to the outlet *u*. Cellular bricks *o* are arranged below the

Fig. 1.

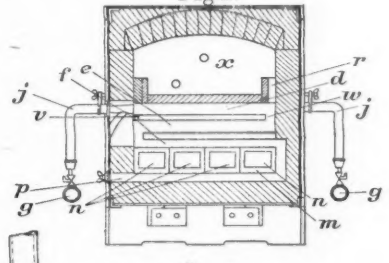
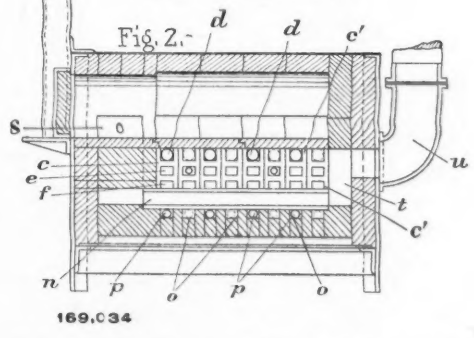


Fig. 2.



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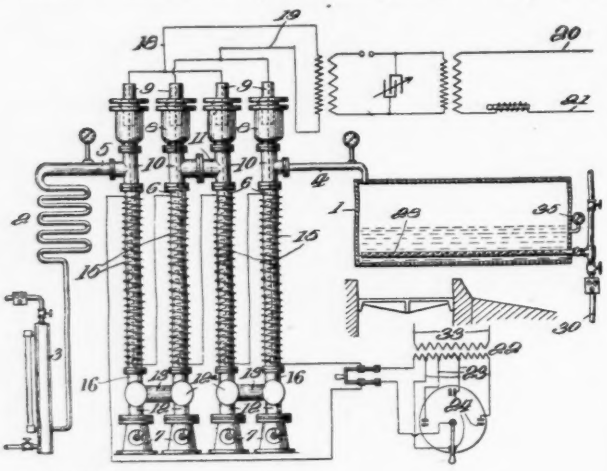
bricks *m* and form passages *p*, through which secondary air passes around the flues *n*, and is thereby heated. Some of the air passes into the combustion chambers *d* through inlets *v*, and some through the inlets *w* at the two ends. The quantity of air supplied to the inlets *v* and *w* determines the extent of combustion at each end, and an under-fired flame or over-fired flame may be produced according as the secondary air is introduced at *v* or *w*. The flame passes up the flues *r* into the heating chamber *x*, and the combustion products pass out through the flues *s*.

169,025. CHLORINATED DERIVATIVES OF TOLUENE, MANUFACTURE OF. British Dyestuffs Corporation, Ltd., Imperial House, Kingsway, London, W.C.2.; A. G. Green and D. A. Clibbens of Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, June 23, 1920.

The proces is more particularly for the chlorination of toluene parasulphonic acid. Toluene derivatives containing two or three chlorine atoms and a nucleus have been obtained by the direct chlorination of toluene and by a lengthy fractionation of the product or from expensive starting materials such as nitro toluidines. In this process toluene parasulphonic acid or a soluble salt in an aqueous solution is chlorinated producing 2 : 5-dichloro- and 2 : 5 : 6-trichloro-toluene-4-sulphonic acid. The mixture is neutralised with alkali when practically the whole of the trichloro-sulphonate is precipitated, leaving the dichloro-sulphonate in solution. Monochloro-toluene parasulphonic acid or its soluble salts may be similarly chlorinated. The di- and trichloro-toluene *p*-sulphonic acids may be hydrolysed, yielding 2 : 5-dichloro-toluene and 2 : 5 : 6-trichloro-toluene respectively. These products may be oxidised to the corresponding derivatives of benzaldehyde which may be used as intermediates in the preparation of triarylmethane dyestuffs. Detailed examples of the process are given.

169,063. HYDROCARBON VAPOURS, ELECTRICAL APPARATUS FOR THE ELECTRO CHEMICAL TREATMENT OF. L. B. Cherry, 1011, Republic Building, Kansas City, Mo., U.S.A. Application date, July 20, 1920.

The apparatus is for subjecting a mixture of hydrocarbon vapour and hydrogen to an electric discharge to obtain products having a higher percentage of hydrogen. Mineral oil is heated in a still 1 and a gas containing hydrogen is injected into it through the perforated pipe 28. This gas may be natural gas, coal gas, hydrogen, superheated steam, or a mixture of these. The mixture of gas and hydrocarbon vapour passes through the pipe 4 to the electrical apparatus 6. Each reaction chamber 6 comprises a vertical metal pipe mounted on a four-way coupling 12, the lower end of which is closed and fixed to the base 7. Each tube 6 also carries a three-way coupling 10 which is surmounted by an enlargement 8 carrying an



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insulator 9. The lateral arms of the couplings 10 and 12 are utilised for connecting the reaction chambers in series at 11 and 13. Each chamber 6 is provided with a fine wire electrode depending from the insulator 9 and carrying a weight at its lower end which maintains it in a concentric position. A high frequency oscillating silent electric discharge is caused to pass between the electrodes and the metal walls of the reaction chambers. The current is derived from any suitable source 20, 21. The opposite terminals are connected by wires 18, 19 to different sets of electrodes 16, as shown, so that the current flows from one set of electrodes to the other through the walls of the chambers. Each chamber is maintained at about red heat, preferably by electrical means. For this purpose each chamber is surrounded by a solenoid 15 which is a good electrical conductor. The solenoids are supplied with alternating current from a power circuit 33 through a transformer 32 and rotary switch 24, and the chamber 6 is heated by induction. The vapour after treatment is passed to a condenser 2 and separator 3. The character of the product can be varied by varying the temperature of the chamber 6, or by varying the frequency of the electrical discharge, or the time during which the mixture is subjected to it. The apparatus may also be used for cracking oils in the vapour state, in which case other gases are not added, and also for the production of aromatic hydrocarbons.

169,101. COKE OVENS. D. Wilputte, New Rochelle, N.Y., U.S.A. Application date, September 22, 1920.

The coke ovens are of the vertical elongated type, and are separated by walls containing vertical heating flues. The flues in each wall are supplied with gas from a common horizontal gas conduit below, and with air from regenerating chambers below the coking chambers. All the vertical flues in each wall open at the top into a common horizontal passage. The gas is injected into each heating flue by means of a burner nozzle of fireclay or other refractory material. A vertical passage is provided from the oven roof into each heating flue, through which the burner nozzles may be inserted, replaced and cleaned. The orifice of each nozzle is of substantially smaller diameter than the remainder, so that the removal of deposits from the crifice is facilitated.

169,113. MOLASSES, PROCESS OF REFINING. H. C. Cutler, 2698, Alden Avenue, Salt Lake City, Utah, U.S.A. Application date, November 8, 1920.

The process is for refining molasses so that the mineral content is less than 5 per cent. and the water content less than 25 per cent. The product is suitable for use as a foodstuff or as a source of industrial alcohol. In the refining of beet sugar molasses, the raw material is mixed with 0·25 per cent. to 10 per cent. of hydrochloric acid or an equivalent of other inverting material, and allowed to stand for such time as will cause from 5 per cent. to 60 per cent. of the sugars to be inverted. The reaction may be facilitated by heating. The mixture is then subjected to dialysis, using a parchment membrane of large area separating the solution from a quantity of pure water. The inorganic salts in the molasses pass into the water as a result of osmotic pressure, and water passes in the opposite direction into the molasses, which ultimately contains about 80 per cent. of water. The solution is then drawn off and boiled in open receptacles, while fresh water is added periodically to maintain the proportion at about 80 per cent. Boiling is continued until the volatile impurities are removed and the mixture is odourless ; at the same time the organic albumenoids separate out. The mixture is then filtered to clarify it, and finally boiled under vacuum until the water content is reduced below 25 per cent. One example of the product obtained by this process contained sugar (sucrose, reducing sugars, etc.) 71·52 per cent., ash or mineral matter 4·42 per cent., and water 24·06 per cent.

169,130. AUTOMATIC ANALYSIS OF GASES, RECORDING APPARATUS FOR. S. A. S. Krogh, 11 Ny Vestergade, Copenhagen, Denmark, and P. H. Pedersen, 67, Fuglebakkevej Frederiksberg, near Copenhagen. Application date, May 10, 1920.

The apparatus used in this invention is described and illustrated in connection with Specification No. 167,824 (*see* THE CHEMICAL AGE, Vol. V., p. 382). This apparatus comprises two or more individual gas analysing apparatus connected in series, each apparatus effecting the measurement and recording of one constituent of the gas mixture. Each apparatus is provided with its own first measuring vessel, absorption vessel, and second measuring vessel. In order to determine the percentage of each constituent in the mixture the volume of residual gas after each analysis is restored to the original volume by the addition of air, so that the same volume of gas is dealt with at each stage.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention : 141,714 (A. Koetzle), relating to tanning material, *see* Vol. II., p. 699 ; 144,677 (F. Hassler), relating to production of soluble tanning extracts, *see* Vol. III., p. 214 ; 145,038 (J. Y. Johnson—Badische Anilin & Soda Fabrik), relating to production of a fertilizer salt from ammonia, *see* Vol. III., p. 242 ; 145,059 (J. Y. Johnson—Badische Anilin & Soda Fabrik), relating to catalytic oxidation of ammonia to oxides of nitro-

gen, *see* Vol. III., p. 243 ; 145,743 (E. I. Du Pont de Nemours & Co.), relating to alkyl anilines, *see* Vol. III., p. 293 ; 146,289 (W. Carpmael), Farbenfabriken vorm. F. Bayer & Co., relating to cyanamide derivatives of alpha halogenated acids, *see* Vol. III., p. 353 ; 146,410 (C. Clerc and A. Nihoul), relating to zinc sulphide, *see* Vol. III., p. 353 ; 146,498 (J. Y. Johnson—Badische Anilin & Soda Fabrik), relating to artificial resins, *see* Vol. III., p. 354 ; 148,242 (Chemische Fabrik Rhenania and Dr. G. A. Voerkelius), relating to manufacture of manures from phosphates and nitric acid, *see* Vol. III., p. 456.

International Specifications not yet Accepted

168,070. CALCIUM CYANAMIDE. Stockholms Superfosfat Fabriks Aktiebolag, 4, Kornhamnstorg, Stockholm. International Convention date, August 21, 1920.

Powdered calcium cyanamide is placed in a cylinder having inclined stirring arms and water, or dilute nitric acid, or a solution of sodium bisulphate or sodium chloride, is sprayed on to it. The mixture is strongly stirred and then granulated and dried in rotating cylinders. These cylinders may be heated by jacketing or by passing hot gases through in counter-current, or by electrical means. The granulated product may be treated with a fatty substance, such as oil.

LATEST NOTIFICATIONS.

169,948. Method of producing ammonium chloride. Christenson, O. L., and Hedman, B. A. October 6, 1920.
169,950. Process of reducing ores. Trent Process Corporation. October 4, 1920.
169,952. Process of treating raw peat and the like. Torfverwertungsges. Dr. Pohl und Von Dewitz. October 6, 1920.
169,962. Process for the manufacture of substances of the fatty acid type from resins. Melamid, M. October 2, 1920.
169,969. Process for dyeing or colouring wood and other fibrous material under pressure. Bowman, J. T. October 7, 1920.
169,990. Process for treating compound minerals and apparatus therefor. Dubreul, G. F. October 5, 1920.
169,996. Apparatus and process for purifying gases. Koppers Co., October 17, 1920.
169,998. Apparatus for extracting fibre from vegetable material. Soc. Parisienne d'Etudes Industrielles et Financières. October 11, 1920.
170,002. Method of and apparatus for measuring the elastic properties of plastic materials, such as rubber, farinaceous pastes, and the like. Soc. d'Enterprise Meunière, and Chopin, M. October 7, 1920.
170,006. Sterilising apparatus. Stassano, H. October 9, 1920.

Specifications Accepted, with Date of Application

146,231. Rotary suction filters. United Filters Corporation. May 24, 1917.
146,234. Lactic acid and tannic or gallic acids, Process for the manufacture of salts of compounds of. E. Kolshorn. June 13, 1919.
147,196. Organic materials from liquids, Method for the selective recovery of. Dorr Co. July 1, 1919.
147,458. Ferro-chromium poor in carbon, Process for producing. Ampere Ges. May 6, 1918.
147,711. Hydrofluoric acid from natural fluorides, Manufacture of. Verein Chemischer Fabriken. December 27, 1918.
153,889. Pulverizer mills. Fuller-Lehigh Co. November 8, 1919.
169,308. Gas producers. O. R. Verity. July 3, 1920.
169,323. Fertilisers, Production of. J. C. Kernot and British Glues and Chemicals, Ltd. July 12, 1920.
169,498. Alkaline condensing agents, Manufacture of. E. Bergve. June 22, 1920.
169,513. Sulphur terpene compounds. W. B. Pratt. June 25, 1920.
169,536. Alkyl amines, Manufacture of. British Cellulose & Chemical Manufacturing Co., Ltd., W. Badder and D. A. Nightingale. July 2, 1920.
169,539. Hydrogen, Combined generating and heating plant adapted to the manufacture of. R. & J. Dempster Ltd., H. S. Knight and F. J. Siddall. July 3, 1920.
169,548. Electrical systems and apparatus for inducing chemical action. W. J. Rickets. July 8, 1920.
169,573. Lubricating greases, Manufacture of. R. Maclaurin and Scottish Bye-Products, Ltd. July 24, 1920.
169,580. Coal and other carbonaceous material, Low temperature carbonisation and gasification of. C. W. Tozer. July 30, 1920.
169,605. Diffusing gases and vapours through liquids, Mechanism for. A. E. O'Dell. (*Canadian American Finance & Trading Co., Ltd.*) August 23, 1920.
169,630. Washing and filtering oil, Apparatus for. J. H. Packer. October 12, 1920.
169,667. α-aminoanthraquinone, Manufacture of. O. Imray. (*Society of Chemical Industry in Basle.*) April 20, 1921.
169,670. Filtration of liquids, Apparatus for. F. H. de Veulle. July 8, 1920.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation. (Lange, W.) Manufacture of mordant dye-stuffs. 26,789. October 10.
Aquazone Laboratories, Inc. Aqueous solutions containing oxygen, and methods of producing same. 27,196. October 13.
Baddiley, J., and British Dyestuffs Corporation, Ltd. Manufacture of dyestuffs of the triarylmethane series. 26,324. October 5.
Bardt, H. Process for dissolving out metal constituents of metalliferous materials. 26,787. October 10.
Bardt, H. Process for precipitating metals from solutions. 26,788. October 10.
Briggs, P. R., and Lessing, R. Manufacture of sulphate of ammonia. 26,571. October 7.
British Dyestuffs Corporation, Ltd., and Morgan, G. T. Manufacture of substituted alpha-naphthylamines and dye-stuffs derived from them. 27,091. October 12.
British Thomson-Houston Co., Ltd., The General Electric Co., and Hailwood, E. A. Manufacture of glass. 26,432. October 6.
Britons, Ltd. Furnaces for production of mineral distillation of definite composition. 27,419. October 15.
Bronnert, E. Manufacture of artificial silk. 26,433. October 6.
Buchner, M. Production of pure alumina. 27,061. October 12.
Chemical Works, formerly Sandoz. Process for manufacture of ergotamine salts. 27,200. October 13. (Switzerland, October 14, 1920.)
Cumberland Coal Power & Chemicals, Ltd. Manufacture of hydrogen or gases rich in hydrogen. 27,188. October 13.
Cumming, A. C., and Klarit, Ltd. Decolorization and clarification of fats, oils, sugars, &c. 27,256. October 14.
Gardner, D. Manufacture of paints. 26,897, 26,898. October 11.
Forwood, G. F., and Tapley, J. G. Treatment of hydrocarbons. 26,555. October 7.
Green, P. Flux for welding cast iron by oxy-acetylene process. 26,367. October 6.
Heenan & Froude, Ltd. Apparatus for transferring heat between air or gases and liquids. 26,831. October 11.
Humphries, H. B. P. Apparatus for bringing liquid into contact with gases. 26,121. October 3.
Imray, O. Y. (Aquazone Laboratories, Inc.). Aqueous solutions containing oxygen, and methods of producing same. 27,196. October 13.
Imray, O. Y. (Soc. of Chemical Industry in Basle.) Manufacture of optically-active aromatic amino-alcohols. 26,247. October 4.
Jaques, A. Manufacture of hydrogen or gases rich in hydrogen. 27,188. October 13.
Jones, H. Sefton-. (Wülfing.) Water soluble compounds of diethyl-barbituric acid and its homologues, and manufacture of same. 26,681. October 8.
Koppers Co. Purification of gases. 26,472. (United States, October 7, 1920.) October 6.
Levin, I. H. Electrolytic cells for generating oxygen and hydrogen. 26,214. October 4.
Patek, J. Production of hydrogen peroxide. 27,114. October 12.
Rakusin, M. A. Treatment of crude oil. 26,138. October 3.
Rosewater, N. Process of purifying natural cellular structures containing volatilizable alkaloidal constituents. 27,205. October 13.
Techno-Chemical Laboratories, Ltd. Drying by evaporation. 26,564. October 7.
Testrup, N. Drying by evaporation. 26,564. October 7.
Turner, W. L. Manufacture of low-carbon ferro-chromium. 26,968. October 12.
Turner, W. L. Manufacture of metals and metallic alloys by the alumino-thermic process. 26,637. October 8.
Varlez, J. Process for treatment of ores and metallic waste. 26,444. October 6.

Recent Wills

Mr. D. H. Thornton, of Ingfield, 120, Duchy Road, Harrogate, Yorks, and of Laverton Grange, Ripon, one of the original directors of The Bradford Dyers Association £146,589

Lieut.-Colonel William Stevens Duff, of Merrielands, Westbury Road, Buckhurst Hill, Essex, late managing director of Grindley & Co., Ltd., Upper North Street, Poplar, oil refiners and tar distillers..... £7,956

Mr. W. Hampson, of 73, Chapel Street, Leigh, chemist and druggist, a former president of the Local Chemists' Association £27,460

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

Market Report

THURSDAY, October 20, 1921.

The demand for chemicals has been fairly brisk during the past week, particularly in regard to such goods as are held in stock and available for immediate delivery. In spite of the depreciation in Continental exchanges, prices remain firm.

The export demand has been much quieter, due, no doubt, to the disturbance caused by exchange fluctuations.

General Chemicals

ACETONE is in active demand, and the price is again inclined to be firmer.

ACID ACETIC.—Stocks have practically disappeared, and such small quantities as remain command high figures.

ACID CITRIC remains uninteresting.

ACID FORMIC passes steadily into consumption; price unchanged.

ACID OXALIC is slightly easier, due to shrinkage in demand. It is generally thought, however, that the price is below intrinsic value.

ACID TARTARIC is rather lower in price, and only a nominal business can be detected. For export the demand has been rather better.

BLEACHING POWDER is slow of sale, and the tendency is in buyers' favour.

COPPER SULPHATE.—There is no change to report.

FORMALDEHYDE is in steady demand and without alteration in value.

IRON SULPHATE is in fair demand, but business is of the hand-to-mouth variety.

LEAD ACETATE is uninteresting.

LEAD NITRATE is unchanged in price, but the demand remains slow.

LITHOPONE.—A slightly better turn-over is indicated, but there is room for very much improvement.

POTASSIUM CARBONATE continues to favour buyers.

POTASSIUM CAUSTIC.—The market is still in secondhands, and stocks are considerable.

POTASSIUM CHLORATE is only a nominal market.

SODIUM ACETATE is in fair demand, and prices are fully maintained.

SODIUM BICHROMATE is slowly getting into a better position, and the end of the secondhand parcels is in sight.

SODIUM CAUSTIC is unchanged.

SODIUM NITRITE.—A small business is reported; prices unchanged.

SODIUM PHOSPHATE.—There is not very much doing, but prices are not expected to decline further.

SODIUM PRUSSIATE remains in active demand, and export enquiries in the market indicate a further hardening tendency.

Coal Tar Intermediates

Business during the past week has been on quiet lines, and buyers continue the policy of covering only their immediate needs as far as possible. A certain amount of enquiry has been received for export, but little business in foreign markets is actually passing.

ALPHA NAPHTHYLAMINE is in quiet demand, with the price unchanged.

ANILINE OIL AND SALT are firm at recent values, and export enquiries have been received for both these materials.

ANTHRAQUINONE is featureless.

BETA NAPHTHOL is quiet and the price remains unchanged.

DIMETHYLANILINE is in fair request at recent values.

DIPHENYLAMINE continues in demand, and the price is without alteration,

"H" ACID is steady at last quoted figures.

PARANITRANILINE has been enquired for, and some fair orders have been placed.

RESORCIN is in fair demand, and parcels at reasonable figures are quickly cleared up.

SALICYLIC ACID is in request without change as to price.

Coal Tar Products

The market for all coal tar products continues to be the same, and there is little enquiry for forward business.

90's BENZOL remains steady at about 2s. 9d. in the Midlands and 3s. in London.

PURE BENZOL is quoted at 3s. 6d. per gallon on rails.

CREOSOTE OIL is weak and is worth from 7¼d. to 7½d. in the North and from 7¾d. to 8d. in the South.

CRESYLIC ACID is inactive, and is quoted at 2s. 2d. on rails for the Pale quality and at from 1s. 9d. to 1s. 11d. for the Dark quality.

SOLVENT NAPHTHA is worth about 2s. 10d. on rails in the Midlands, and 3s. to 3s. 1d. in the South. Supplies are now very plentiful, but there is little fresh business doing.

NAPHTHALENE is very quiet and Crude qualities are worth from £5 to £8 per ton, while Refined are worth from £14 to £17.

PITCH.—The market is quiet and unsettled; buyers abroad are holding off, and prices have a downward tendency.

Sulphate of Ammonia

The position is unchanged. There is a satisfactory demand for home trade and abroad.

Current Prices

Chemicals

	per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	2	1	to	0	2	2
Acetone oil	ton	87	10	0	to	90	0	0
Acetone, pure	ton	90	0	0	to	95	0	0
Acid, Acetic, glacial, 99-100%	ton	60	10	0	to	62	10	0
Acetic, 80% pure	ton	45	0	0	to	48	0	0
Arsenic	ton	95	0	0	to	100	0	0
Boric, cryst	ton	65	0	0	to	68	0	0
Carbolic, cryst. 39-40%	lb.	0	0	6½	to	0	0	7
Citric	lb.	0	2	5	to	0	2	6
Formic, 80%	ton	65	0	0	to	67	10	0
Gallic, pure	lb.	0	3	9	to	0	4	0
Hydrofluoric	lb.	0	0	8½	to	0	0	9
Lactic, 50 vol.	ton	43	0	0	to	45	0	0
Lactic, 60 vol.	ton	46	0	0	to	48	0	0
Nitric, 80 Tw.	ton	38	0	0	to	40	0	0
Oxalic	lb.	0	0	8½	to	0	0	9
Phosphoric, 1.5	ton	45	0	0	to	47	0	0
Pyrogallic, cryst	lb.	0	7	3	to	0	7	6
Salicylic, Technical	lb.	0	1	2	to	0	1	3
Salicylic, B.P.	lb	0	1	6	to	0	1	7
Sulphuric, 92-93%	ton	8	0	0	to	8	10	0
Tannic, commercial	lb.	0	3	6	to	0	3	9
Tartaric	lb.	0	1	5	to	0	1	6
Alum, lump	ton	18	0	0	to	18	10	0
Alum, chrome	ton	37	10	0	to	40	0	0
Alumino ferric	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0	0
Ammonia, anhydrous	lb.	0	1	10	to	0	2	0
Ammonia, .880	ton	35	0	0	to	37	0	0
Ammonia, .920	ton	22	0	0	to	24	0	0
Ammonia, carbonate	lb.	0	0	4	to		—	
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	45	0	0	to	47	10	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3	0
Amyl acetate	ton	150	0	0	to	160	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0

	per	£	s.	d.		£	s.	d.
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	15	0	0	to	16	0	0
Nitrate	ton	42	10	0	to	45	0	0
Barium Sulphate, blanc fixe, dry	ton	26	0	0	to	28	0	0
Sulphate, blanc fixe, pulp	ton	16	0	0	to	16	10	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	14	0	0	to		—	
Borax crystals	ton	31	0	0	to	32	0	0
Calcium acetate, Brown	ton	8	0	0	to	9	0	0
,, Grey	ton	10	0	0	to	11	0	0
Calcium Carbide	ton	22	0	0	to	23	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	60	0	0	to	62	0	0
Casein, technical	ton	85	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	6	to	0	3	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	11	0	to	0	11	6
Oxide, black	lb.	0	10	6	to	0	11	0
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	29	10	0	to	30	10	0
Cream Tartar, 98-100%	ton	135	0	0	to	140	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde 40% vol.	ton	95	0	0	to	97	0	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	5	5	0	to	5	10	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	48	0	0	to	50	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	48	10	0	to	50	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	26	0	0	to	28	0	0
Magnesium chloride	ton	12	0	0	to	13	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	15	10	0	to	17	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	85	0	0	to	90	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	65	0	0	to	66	0	0
Nickel ammonium sulphate, double salt	ton	67	0	0	to	68	0	0
Potash, Caustic	ton	33	0	0	to	33	10	0
Potassium bichromate	lb.	0	0	9	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride	ton	36	0	0	to	38	0	0
Chlorate	lb.	0	0	5	to	0	0	5½
Meta bisulphite, 50-52%	ton	120	0	0	to	125	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	1	2	to	0	1	4
Prussiate, red	lb.	0	2	4	to	0	2	6
Prussiate, yellow	lb.	0	1	2½	to	0	1	3
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt	3	5	0	to		—	
Seconds	cwt	3	0	0	to		—	
Sodium acetate	ton	28	0	0	to	30	0	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	6½	to	0	0	7
Bisulphite, 60-62%	ton	25	0	0	to	27	10	0
Chlorate	lb.	0	0	4¾	to	0	0	5
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	10	0	to	26	0	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	40	0	0	to	42	0	0
Phosphate, crystal	ton	23	10	0	to	25	10	0
Perborate	lb.	0	1	6	to	0	1	7
Prussiate	lb.	0	0	8½	to	0	0	9
Sulphide, crystals	ton	17	0	0	to	18	0	0
Sulphide, solid, 60-62%	ton	24	10	0	to	25	10	0
Sulphite, cryst.	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	80	0	0	to	85	0	0
Strontium Nitrate	ton	70	0	0	to	72	10	0
Strontium Sulphate, white	ton	7	10	0	to	8	10	0
Sulphur chloride	ton	41	0	0	to	42	0	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Tin Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride, 102 Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96-98%	ton	50	0	0	to	55	0	0
Oxide, 99%	ton	40	0	0	to	42	0	0
Dust, 90%	ton	47	10	0	to	50	0	0
Sulphate	ton	21	10	0	to	22	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	3	3	to	0	3	6
Alphanaphthol, refined	lb.	0	3	9	to	0	4	0
Alphanaphthylamine	lb.	0	2	6	to	0	2	8
Aniline oil, drums extra	lb.	0	1	5	to	0	1	6
Aniline salts	lb.	0	1	6	to	0	1	7
Anthracene, 40-50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	4	3	to	0	4	6
Benzidine, base	lb.	0	6	0	to	0	6	6
Benzidine, sulphate	lb.	0	6	6	to	0	7	0
Benzoic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	5	9	to	0	6	0
Betanaphthol	lb.	0	2	3	to	0	2	6
Betanaphthylamine, technical	lb.	0	9	0	to	0	9	6
Croceine Acid, 100% basis	lb	0	4	6	to	0	5	0
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	6
Dinitrochlorbenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthaline	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	3	9	to	0	4	0
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	8	0	to	0	8	6
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	6	to	0	7	0
Monosulphonic Acid (2:7)	lb.	0	7	0	to	0	7	6
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	4	9	to	0	5	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	3	to	0	1	4
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorbenzol	lb.	0	1	1	to	0	1	2
Orthotoluidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	0	to	0	13	6
Para-amidophenol, hydrochlor	lb	0	12	6	to	0	13	0
Paradichlorbenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	6	to	0	4	9
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	13	0
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	5	0	to	0	5	6
Resorcin, pure	lb.	0	8	0	to	0	8	6
Salol	lb.	0	2	6	to	0	2	9
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

French Potash

WITH the clearance of stocks held over from last season the potash trade has acquired a better tone. Merchants are now more inclined to purchase for future delivery, and supplies coming forward are generally sold before landing at the ports Recent cargoes of French kainit and potash manure salts, 20 per cent. (sylvinite), in very fine condition and testing in some cases more than 2 per cent. over guaranteed analysis, indicate that the Alsatian mines are determined to maintain the place which they have held during the past two years.

The strenuous competition which has prevailed during the month of September has now brought price fluctuations almost to a standstill, and in most cases current quotations for the lower grades have remained constant during the past few weeks. Since the Silesian problem seems now on the eve of a settlement a considerable development of the Polish deposits may be expected at an early date.

UNITED ALKALI CO., LTD.—The directors have decided further to defer consideration of the payments of any interim dividend on the cumulative preference shares.

Company News

URAL CASPIAN OIL.—The annual general meeting will be held at St. Helen's Court, E.C., on October 20.

INTERNATIONAL NICKEL CO.—A quarterly dividend of 1½ per cent. is payable on November 1 to holders of preferred stock.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS.—The register and transfer books of the 5 per cent., second debenture stock are closed from October 19 to November 1 for the preparation of the half-yearly interest warrants.

BRITISH PORTLAND CEMENT CO., LTD.—The directors announce an interim dividend of 5 per cent. (actual), less tax, in respect of the current year. The dividend a year ago was 7½ per cent., less tax.

UNITED INDIGO & CHEMICAL CO., LTD.—At the annual meeting held in Manchester on Wednesday a further dividend of 7½ per cent. on the ordinary shares was confirmed, making 12½ per cent. for the year.

BRYANT & MAY.—The directors announce an interim dividend of 4 per cent., free of tax, on the ordinary and partnership shares for the half-year ended September 30, payable on November 1. The dividend last year was the same.

ALIANZA CO.—An interim dividend of 15 per cent., less tax, is announced on account of profits for the current year. Warrants will be posted on November 2 to registered holders in the United Kingdom and the transfer books will be closed from October 26 to November 2 inclusive.

ANGLO CHILIAN NITRATE & RAILWAY.—Coupons due on November 1 on the 4½ per cent. consolidated mortgage bonds will be paid on and after that date at the Anglo South American Bank, Ltd., 62, Old Broad Street, E.C. Coupons must be left three days. Country holders are requested to forward the coupons through banks and not by post.

SADLER & CO., LTD.—The net profit to June 30 last amounted to £33,500, which, with £15,600 brought in, gives an available balance of £49,100 The sum of £25,000 was set aside for depreciation, and the dividend on the ordinary shares is maintained at 12 per cent. for the year, leaving £9,900 to be carried forward.

CENTRIFUGAL SEPARATORS, LTD.—At an extraordinary general meetimg held on October 14, Sir. A. Trevor Dawson presiding, it was resolved unanimously to extend the options to subscribe for the "A" shares of the company for twelve months from October 14, 1921, any extensions not taken up by the present option holders to be given to the general body of shareholders on the same terms.

LEVER BROTHERS, LTD.—Dealings in the following securities have been specially allowed by the Stock Exchange Committee under Rule 148a. These securities will rank *pari passu* with those in which special settling days have already been appointed as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted: 980 7 per cent. preference shares of £1 each, fully paid, Nos. 23,564,943 to 23,565,922; and 162 8 per cent. "A" preference shares of £1 each, fully paid, Nos. 15,468,544 to 15,468,705.

HARRISONS & CROSFIELD, LTD.—The report to June 30 last states that the net profit was £164,466, to which has to be added £37,874, brought in. From this have been paid dividends of 6 per cent. on the cumulative preference shares, 10 per cent. on the preferred ordinary shares, 7½ per cent. on the deferred ordinary shares, and the sum of £5,941 among the holders of management shares, making a total of £157,815. This leaves a balance of £44,525, which it is proposed to carry forward. As regards a proposed alteration of Clause 92 of the articles of association, in view of the fact that the total dividend distributed among the holders of management shares during the past year was under £6,000, and that the amount of future distributions may remain doubtful for a time, it was found necessary for the company to provide some alternative remuneration for the directors, all of whom are engaged in the business and perform duties of managing directors. A resolution was submitted at an extraordinary general meeting following the ordinary meeting, which was held at 38, Eastcheap, E.C., yesterday (Friday).

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. NO.
South African	Red oxide paint in paste; tar or tar substituted. Replies to the Inquiry Room, Dept. of Overseas Trade, 35, Old Queen Street, London	—
Denmark ...	Rape oil; vegetable oil	—
Buenos Aires	Lubricants; disinfectants; explosives; bleachings	—
Panama ...	Paint; varnish; oil	340
Toronto ...	Chemicals; dry colours; dyestuffs; gums; zinc oxide; waxes; iron of perchloride ...	314
France ...	Sulphate of copper	323
Hamburg ...	Crude oils; edible oils	324
Johannesburg	Tar or tar substitute	—
Brussels ...	Manufactured fuel; asbestos; graphite	318
Trinidad ...	Glassware	—

Tariff Changes

SWITZERLAND.—As from September 19 last an import licence is required for the importation of explosive materials.

POLAND.—Petroleum and petroleum products are subject to an export duty of from 2 to 10 marks per kilog.

NIGERIA.—A revised list of Customs Duties affecting, *inter alia*, explosives, salt, soap, fuel oils, kola nuts and matches appeared in the Board of Trade *Journal* (October 6, p. 352).

NETHERLANDS.—Solutions of rubber in benzine, benzol, carbon disulphide are now subject to an import duty of 5 per cent., *ad valorem*. Isobutyl alcohol may be imported free of duty.

CZECHO-SLOVAKIA.—An export licence is no longer necessary for india rubber and wares thereof; glass and glassware; instruments and apparatus; and chemical auxiliary substances and chemical products (with certain exceptions). These goods are also exempt from payment of export duties.

SWEDEN.—As from October 1 prohibition on the export of raw phosphates; colouring matter, solid or otherwise, not containing spirit; sodium nitrate; Stassfurth salts, refined or not; Thomas phosphate, or so-called Thomas slag, unground; Norwegian saltpetre (calcium nitrate); nitrogen carbide; and guano and other manure consisting of animal waste; has been withdrawn.

GERMANY.—The German Minister of Finance has issued an Order increasing from 900 to 1,900 per cent. the premium which is leviable when the "gold" duties of the Customs Tariff are paid in paper currency. The effect of the Order is to double the paper currency duties by requiring 2,000 paper marks to be paid for each 100 marks "gold" duty leviable, instead of 1,000 paper marks as hitherto. The new Order came into operation on Thursday. The German Government having signified its assent to the Resolution of the Supreme Council, dated August 13, 1921, regarding the abolition of the economic Sanctions in the Occupied Territory, the Inter-Allied Rhineland High Commission have issued an Ordinance (Number 98), repealing the Ordinances issued to give effect to the Sanctions, and embodying certain Regulations for the period of transition, and measures for securing protection against consequences of any act done by them under the authority of the repealed Ordinances. The provisions of the present Ordinance, which are of more immediate interest to traders with the Occupied Territory, are those contained in Articles 3 and 11 regarding import and export licences. A copy of these Articles was published in the Board of Trade *Journal* (October 6, p. 354).

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Companies Winding-up Voluntarily

MIDLAND COUNTIES GLUE CO., LTD.—A. M. Foster, of The Poplars, Moulton, Northamptonshire, appointed liquidator.

INECTO, LTD.—H. J. de Courcy Moore, of 2, Gresham Buildings, Guildhall, E.C.2, appointed liquidator.

Notice of Dividend

CONNELL, ROWLAND WILLIAM (junior), 33, Hanover Street, Liverpool, artificial manure manufacturer. Amount per £, 8d., first and final, payable October 20, Offices of the Official Receiver, 11, Dale Street, Liverpool.

Notice of Intended Dividend

KEATS, PHILIP PHINEAS, 167, Mary Street, Balsall Heath, Birmingham, chemist. Last day for receiving proofs, October 31. Trustee, J. D. Kerr, 5, Waterloo Street, Birmingham.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of* 1908, *provides that every Mortgage or Charge, as described therein, created after July* 1, 1908, *shall be registered within* 21 *days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July* 1, 1908, *require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

DALGLEISH & SONS, LTD., Nottingham, mineral water manufacturers, &c.—Reg. October 10, mortgage, to London Joint City & Midland Bank, Ltd., securing all moneys due or to become due to the Bank; charged on premises at junction of Cope Street and Palin Street, Nottingham. *£4,500 amount of floating bank overdraft. September 24, 1920.

HAMPSHIRE (F. W.) & CO., LTD., Derby, chemists, &c.—Reg. August 8, £5,000 debenture, to F. W. Gilbert, The Manor, Chellaston, wholesale milk dealer; general charge; also reg. September 30, debenture securing all moneys not exceeding £3,000 which mortgagees may be called upon to pay under their guarantee to company's bankers, to F. W. Gilbert, The Manor, Chellaston, wholesale milk dealer, and another; general charge. *Nil. August 6, 1920.

LOW TEMPERATURE CARBONISATION LTD., London, E.C.—Reg. October 10, supplemental Trust Deed dated September 26, 1921, securing £50,000 first debenture stock; charged on property as charged in original Trust Deed reg. Nov. 22, 1919. *£184,787. January 13, 1921.

MURRAYS PHARMACIES, LTD., Leeds.—Reg. October 6 (by order on terms), £1,000 mortgage, to J. Mackay, Selby, contractor's manager, and another; charged on 74, Gowthorpe, Selby. *£1,000 mortgage, £19 11s. 5d. interest. August 30, 1921.

SAPON SOAPS, LTD., London, E.C.—Reg. October 3, £5,000 debentures; general charge. *Nil. January 5, 1921.

VEGLENE OIL REFINERY & CHEMICAL WORKS, LTD., Cardiff.—Reg. October 4, £2,000 debentures; general charge.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BAKER, J. J., 77, Broadway, Leigh-on-Sea, chemist, £14 16s. 7d. September 13.

BLUNT, W. H., & SON, 70, Snow Hill, Birmingham, druggists, £10 Sept 3s. 2d.ember 12.

STANSFIELD, John Lord, Boothfold, Waterfoot, chemical manufacturer, £19 16s. August 10.

HILL, G. A. G., 319, King's Road, Chelsea, chemist, £17 1s. 6d. July 27.

WHEELER, H. F., 44, Tachbrook Street, Victoria, patent medicine vendor, £32 16s. 5d. August 6.

DONALDSON, G. A., 403, Commercial Road, Portsmouth, chemist, £14 16s. 2d. August 9.

WILSON, J. W., 61, Holborn Hill, Nechells, Birmingham, chemist (and others), £14 19s. 2d. September 1.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 *and* 117, *Chancery Lane, London, W.C.2:—*

AMISOL, LTD., manufacturing chemists, drysalters, &c. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, £100. Subscribers: T. Thomas, S. Wilman, W. Sowden, T. C. Hammond, E. V. Chambers.

BANFORD, H., & Co., LTD., 93/94, Chancery Lane, W.C. 2. Manufacturers of china and glass ware. Nominal capital, £1,000 in 1,000 ordinary shares of £1 each. Directors, A. Studer and H. Stanley. Qualification of directors, one share.

BRUNT CHEMICAL CO., LTD., 21, Cannon Street, Manchester, chemists, druggists, drysalters, oil and colourmen. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors, H. H. Brunt and H. Brunt. Qualification of directors, £100. Governing Director, £500.

DURASTIC BITUMINOUS PAINT CO., LTD., 52, Queen Victoria Street, E.C. 4, manufacturers of paints, oil and varnishes. Nominal capital, £100 in 100 shares of £1 each. Directors, to be appointed by subscribers. Qualification of directors, one share.

GOLCONDA METAL CO., LTD., manufacturers of metallic alloys. Nominal capital, £10,000 in 8,000 shares of £1 each and 40,000 shares of 1s. each. Directors, to be appointed by subscribers. Qualification of directors, one share. Subscribers: H. M. Carlin and J. E. Williams.

PETROL DISTRIBUTORS, LTD., 15, New Burlington Place, Regent Street, W. 1. Distributors, transporters and brokers in petroleum and other oils. Nominal capital, £15,000 in 14,750 preference shares of £1 each and 5,000 ordinary shares of 1s. each. Directors: The Earl of Carrick, Sir R. D. Moncreiffe, Bart., Lt.-Col. C. Jarrott and A. E. Hodgson.

BUNSEN BLOWER CO., LTD., Lloyds Chambers, Market Street, Colne, Lancashire. Manufacturers of Bunsen blowers and other appliances and inventions relating to the furnaces of steam boilers, &c. Nominal capital, £100 in 100 shares of £1 each. Directors: E. Dixon, 30 Station Road, Wesham, near Preston; J. C. Fields, 92, Barrowford Road, Colne.

RHODES, JOHN R., & CO., LTD., Refiners, blenders, and merchants of oils, tallows and greases. Nominal capital, £6,000 in 6,000 shares of £1 each. Directors: F. Milne and E. F. Helmsing. Qualification of directors, £500. Remuneration of directors: F. Milne, £600; E. F. Helmsing, £400.

Voluntary Liquidation of Vauxhall Glass Company

A MEETING of the creditors of the Vauxhall Glass Manufacturing Co., Ltd., Nightingale Lane, London, S.W., was held on Wednesday at the Institute of Chartered Accountants, Mr. W. A. Pepper, liquidator of the company, in the chair. The chairman explained that the company had gone into voluntary liquidation (*See* THE CHEMICAL AGE, October 1, page 407), and that a meeting had become necessary to appoint a liquidator in his place, or a joint liquidator with him. A statement of affairs as at September 28 last showed liabilities amounting to £14,629 3s. 3d., made up of the claims of the preferential creditors, £250; secured creditors, £8,868 4s. 6d.; and trade creditors, £5,510 18s. 9d. It was decided to ratify Mr. Pepper's appointment as liquidator, and a committee of inspection was also appointed. The schedule of creditors includes: Chas. Page & Co., Ltd., £32; Chemical Supply Co., £30; Brunner, Mond & Co., Ltd., £106; C. Melin & Co., £350 and £204; Johnson & Sons (Manufacturing Chemists), Ltd., £56; and G. Tisseron, Veuve et Fils, £53.

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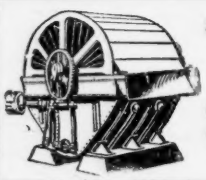
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